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IN THE

Supreme Court of the United States

OCTOBER TERM, 1973

No. 73-1145

TECHNICAL DEVELOPMENT CORPORATION
and FRANKLIN F. OFFNER, *Petitioners*

v.

UNITED STATES

PETITION FOR WRIT OF CERTIORARI TO UNITED STATES COURT OF CLAIMS

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TECHNICAL DEVELOPMENT CORPORATION
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UNITED STATES

PETITION FOR WRIT OF CERTIORARI TO UNITED STATES COURT OF CLAIMS

The Plaintiffs, Technical Development Corporation and Franklin F. Offner, petition for a writ of certiorari to review the decision of the United States Court of Claims.

OPINIONS BELOW

The opinions of the Court of Claims, which have not yet been officially reported, are set forth in the Appendix, pages 1 to 71, *infra*.

JURISDICTION

The decision of the Court of Claims was issued on June 20, 1973, although the final judgment resulting therefrom has not been entered.[1]

A timely Motion for Rehearing was denied by the Court on October 26, 1973.[2] This petition for certiorari was filed within ninety (90) days of that date. The jurisdiction of this Court is invoked under 28 U.S.C. 1244(1).

QUESTIONS PRESENTED

1. Does the Court of Claims have authority to determine that a person's patent rights are licensed to the Federal Government in the absence of a contractual obligation or statutory authority?

2. Are terms of contracts between the Federal Government and citizens binding on the Court of Claims, so that the taking of a citizen's patent rights on terms other than those set out in the contract, or when he was not a party to the contract, but predicated on the grounds of "public policy" or "implied license", constitutes a taking of the citizen's property without due process of law and without just compensation, in violation of the Fifth Amendment of the Constitution?

3. Did the Court of Claims commit procedural errors in violation of due process by framing issues af-

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[1] Certain claims of the patents in suit were selected for trial, and other claims were held in abeyance pending the outcome as to the selected claims. The remand of the case to the Trial Commissioner for any further proceedings involves only those claims held in abeyance (App. *infra* p. 17). The judgment has been entered as to the matters here involved.

[2] See Appendix, pp. 73-84.

ter the closing of proofs, which issues were then decided without giving Petitioners an opportunity to present evidence on those issues?

STATUTES AND RULES INVOLVED

U.S. Constitution, Amendment V:

> "No person shall * * * be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation."

28 U.S.C. § 1498:

> "(a) Whenever an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, the owner's remedy shall be by action against the United States in the Court of Claims for the recovery of his reasonable and entire compensation for such use and manufacture.
>
> * * *
>
> "A Government employee shall have the right to bring suit against the Government under this section except where he was in a position to order, influence, or induce use of the invention by the Government. This section shall not confer a right of action on any patentee or any assignee of such patentee with respect to any invention discovered or invented by a person while in the employment or service of the United States, where the invention was related to the official functions of the employee, in cases in which such functions included research and development, or in the making of which Government time, materials or facilities were used."

35 U.S.C. § 261:

> "Subject to the provisions of this title, patents shall have the attributes of personal property.

"Applications for patent, patents, or any interest therein, shall be assignable in law by an instrument in writing. The applicant, patentee, or his assigns or legal representatives may in like manner grant and convey an exclusive right under his application for patent, or patents, to the whole or any specified part of the United States."

Court of Claims Rules:

Rule 37. Defenses:

"(b) Affirmative Defenses: In pleading to a preceding pleading, a party shall set forth affirmatively accord and satisfaction, duress, estoppel, failure of consideration, fraud, illegality, laches, license, payment, release, res judicata, statute of limitations, waiver, and any other matter constituting an avoidance or affirmative defense. When a party has mistakenly designated a defense as a counterclaim or a counterclaim as a defense, the court (or the commissioner) may, if justice so requires, treat the pleading as if there had been a proper designation."

Rule 38. Defenses and Objections; When and How Presented:

"(b) Defenses; How Presented: Every defense, in law or fact, to a claim for relief in any pleading, whether a claim, counterclaim, or a third-party claim, shall be asserted in the responsive pleading thereto if one is required, except that the following defenses may, at the option of the pleader, be made by motion: (1) lack of jurisdiction of the subject matter or the person, and (2) failure to state a claim upon which relief can be granted. A motion making either of these defenses shall be filed before pleading further if a further pleading is permitted. If a pleading sets forth a claim for relief to which the adverse party is not required to serve a responsive pleading, he may assert at the trial any defense in law or fact to that claim for relief. If, on a motion to dismiss for failure of the pleading to state a claim upon which relief can be granted, matters outside the pleading are presented to and are not excluded by the court, the motion shall be treated as one for summary judgment and shall be disposed of as provided in Rule 101, and all parties shall be given reasonable opportunity to present all material made pertinent to such a motion by Rule 101."

* * *

"(h) Waiver of Defenses: A party waives all defenses and objections which he does not present either by motion as hereinbefore provided or in his answer or reply, except (1) that the defense of failure to state a claim upon which relief can be granted, and the objection of failure to state a legal defense to a claim, may also be made by a later pleading, if one is permitted, or by motion for judgment on the pleadings: and (2) that whenever it appears by suggestion of the parties or otherwise that the court lacks jurisdiction of the subject matter, the court shall dismiss the action."

Rule 39. Amended and Supplemental Pleadings:

* * *

"(b) Amendments To Conform to the Evidence: When issues not raised by the pleadings are tried by express or implied consent of the parties, they shall be treated in all respects as if they had been raised in the pleadings. Such amendments of the pleadings as may be necessary to cause them to conform to the evidence and to raise these issues may be made upon motion of any party at any time, even after judgment; but failure so to amend does not affect the result of the trial of these issues. If evidence is objected to at the trial on the ground that it is not within the issues made by the pleadings, the court may receive the evidence and may allow the pleadings to be amended, and shall do so freely when the presentation of the merits of

> the action will be subserved thereby and the objecting party fails to satisfy the court that the admission of such evidence will prejudice him in maintaining his action or defense upon the merits. The court shall afford the objecting party an opportunity to meet such evidence."

STATEMENT OF THE CASE

Petitioners brought this suit in the Court of Claims under 28 U.S.C. § 1498, *supra,* to recover reasonable and entire compensation for the unauthorized use by the United States of Petitioners' patent rights. Dr. Offner owns the patent rights and Technical Development Corporation is his exclusive licensee. Issues of validity and infringement were expressly joined, and were tried. However, without determining whether the patents are valid or are being used by the United States, the Court of Claims concluded that the United States received a license under the patent rights by virtue of certain Government contracts.

Near the end of World War II, jet propelled aircraft were introduced by the enemy forces in Germany, and the United States Government was struggling to perfect its own jet powered aircraft. Fuel control systems for aircraft jet engines had been developed in this country as early as 1943, but were considered to be unsatisfactory. Petitioner, Offner, at his own expense, studied the problems of jet engine control systems and in 1944 developed, built and tested, still at his own expense, an electronic engine speed control system which was superior to the prior control systems.[3] (Appendix, *infra,* pp. 32-34)

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[3] *Offner Products Corp.* v. *Renegotiation Board,* 50 T.C. 856, 864:

> "It is clear that petitioner's contribution to the defense effort was historic and immense. Ten years of effort went

In 1945, Dr. Offner discussed his new control system with Air Force personnel at Wright Field. After a demonstration on a jet engine, the Air Force, in 1946, issued to Dr. Offner's company, Offner Electronics Inc., a purchase order W 33-038 ac 15202 (referred to as the 15202 contract) for one of the control systems. This contract contained a standard "patent rights" clause under which Offner Electronics Inc., agreed to grant to the Government a royalty-free license under each invention conceived or first actually reduced to practice in the performance of the contract (Appendix *infra* p. 40).

Dr. Offner applied for a patent on his electronic engine speed control system in August, 1947, and a patent, No. Re. 24,809 (referred to as the '809 patent), was granted subsequently. Dr. Offner continued development and improvement work on his electronic control system. He applied for a patent on his improved system on March 31, 1949, and the patent (referred to as the '908 patent) subsequently issued. The '809 and the '908 patents are the patent rights for which the Petitioners are seeking compensation in the Court of Claims.

In 1948, the Department of the Air Force awarded a contract to Allison Division of General Motors Corporation, Contract W33-038 ac 20375 (referred to as the 20375 contract). This also contained a "patent rights" clause that was substantially identical with that in the 15202 contract. Under the 20375 contract,

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into the development and perfection of the electronic jet engine fuel control. It constituted a 'breakthrough' in the known art and was a significant gateway in the history of electronic gas turbine controls. It gave the United States a decided edge over its international rivals. It saved the Government millions of dollars in money and in time."

Allison was required to purchase and conduct tests of electronic control systems furnished by Thompson Products Company, then a licensee of Offner, and by Bendix, Petitioners' competitor.[4]

Allison obtained the jet engines from the Air Force and purchased the Offner control system from Thompson Products under a subcontract that included the standard "patent rights" clause. Allison then assembled the control systems on the jet engines and conducted the tests required by the contract.

The improved jet engine control system was invented by Dr. Offner before the Air Force awarded the contract to Allison. At the time of the subcontract to Thompson Products, Offner had granted licenses to Thompson Products Company under both the '809 and the '908 patents. Thompson Products, as licensee, had the right to grant sublicenses, but only to the extent of permitting sublicensees "to use, to permit the use of, and sell" the patented equipment purchased from Thompson Products. Thompson Products did not have the right to grant sublicenses to make, or to have made, the Offner control systems. Neither Dr. Offner nor Offner Electronics Inc. was a party to the Allison subcontract, nor were they aware of the existence of the "patent rights" clause in that subcontract.

Both of Petitioners' jet engine control systems have been incorporated in jet engines purchased by the Government from unlicensed sources. In 1957, Petitioners filed an administrative claim with the Air Force, seeking compensation for the use of the patented inventions. Having received no action by the Air Force, Petitioners in 1964 brought this suit for the unauthorized use and manufacture by or for the United States of jet engines incorporating the inventions of the '809 and '908 patents.[5] See *Richmond Screw Anchor Co. v. United Sates,* 275 U.S. 331, 343 (1927). The parties agreed to try the issue of liability first and, if liability is found, then the issue of damages.

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[4] In an interference proceeding in the Patent Office between Bendix and Offner, the latter was found to be the prior inventor of the electronic fuel control system.

Between 1964 and 1968, the Defendant conducted extensive discovery, after which the trial was held before the Commissioner[6] on the issue of validity of Petitioners' patents and the issue of whether the control systems purchased by the Government infringed Petitioners' patents.

Just before the liability trial, the Government suggested that further investigation would be required to determine whether it had a proper basis for asserting a license defense under either of these contracts. The Government never affirmatively pleaded or otherwise raised a license defense under the 15202 or the 20375 contract before the start of the infringement and validity trial.

The trial Commissioner, after completion of the trial sessions, allowed the Government additional time in which to report on whether a license defense would be asserted, and, if so, to state the basis for the defense. The Government did not come forward with any position on the license defense, but simply submitted a group of documents, including a copy of the 20375 contract, and moved for the closing of proof. A copy of the 15202 contract had been introduced during the trial sessions as relevant to the issue of validity. No trial session was held on the license issue.

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[5] The six year statute of limitations is tolled while an administrative claim is pending. 35 U.S.C. § 286.

[6] Court of Claims Rule 14 provides that every case considered in the Court of Claims shall be referred to a commissioner for trial.

The proceedings, as to the license defense, are succinctly stated in the Opinion of the Court of Claims, Appendix page 2, as follows:

> "The defendant never affirmatively pleaded or otherwise raised its license defense before the start of the trial, but instead raised the possibility of presenting proof with respect to such a defense only after the trial had already commenced. Following the disclosure of the possible license defense, there were discussions and correspondence between the parties and the commissioner concerning the scheduling of separate trial proceedings to focus specifically on such a defense. Six months after the regular trial sessions were concluded, the defendant submitted a voluminous package of documents apparently meant, in large part, to be the basis of its license defense, thereby avoiding the necessity of a separate trial. The documents were admitted into evidence by a stipulation between the parties as to their authenticity, and thereafter the proofs were closed."

After the close of proofs, Petitioners filed proposed findings of fact based on the trial record and a brief relating to infringement of Petitioners' patents by the Government. The Defendant then filed its proposed findings of fact and a brief relating to the issues of validity and infringement, and stating for the first time a defense of license by virtue of the patent rights clause of the 20375 contract.[7] The Defendant did not contend for a license under the 15202 contract. Petitioners then filed a reply brief arguing that the license defense had not been properly tried, and that the facts proven by the Government do not support the license defense.

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[7] Appendix p. 55.

The Commissioner entered findings of fact, an opinion, and recommended conclusions of law (App. pp. 5-71). The Commissioner found that the invention of the '809 patent was first actually reduced to practice under the 15202 contract, and therefore licensed to the Government under the patent rights clause. Nevertheless, the Commissioner acknowledged the incompleteness of the proof of whether the invention of the '809 patent was actually reduced to practice by Petitioners before the 15202 contract (App. p. 67, finding 54c ii).

The Commissioner determined that the Government is licensed under the '908 patent under an implied license based on the relationship between Offner and Thompson. Alternatively, the Commission found a license on the theory that Offner and Thompson were engaged in a joint venture, which bound Offner, under the provisions of the contract. (App. p. 70 Findings 62 and 64)

The Government's motion to close the proof without going forward with its often expressed intention to take proof on the suggested, but not pleaded, issue of license, caused the Petitioners to conclude that the Government had waived (Rule 38(h), *supra*) the suggested license defense. When the Defendant's brief was filed, first asserting the license defense, the Petitioners suggested to the Commissioner the reopening of proofs on this belated defense. This was disregarded by the Commissioner, and later, when a similar request was made to the Court, it was denied.

The Court adopted the Commissioner's findings of fact and conclusions of law, and concurred that an implied license accrued to the Government:

> ". . . . . the court emphasizes its particular reliance on the implied license as grounds for defendant having a right to use the invention in question because it is very clear that defendant would still win even if the court were to grant plaintiff's motion to reopen and to consider all the evidence now proffered in that motion. Alternatively, the court adheres to the joint venture basis also relied upon by Trial Commissioner Davis, on the basis of evidence before him." (Opinion pp. 4-5)

Petitioners objected to the Commissioner's finding of a license under either patent and urged that Petitioners did not have an oportunity to be heard on these issues. The Court of Claims dismissed Petitioners' procedural arguments on the ground that Petitioners should have "had a clear understanding of the thrust of the Defendant's license defense" from Defendant's brief, and that Petitioners' request to reopen the proofs is "incompatible with the principle of certainty in judicial determinations" (Appendix, p. 3).

After the Court's decision adopting the Commissioner's Findings of Fact and Recommended Conclusions of Law, Petitioners applied for rehearing on the basis of alleged procedural errors. The Motion for Rehearing was denied without comment by the Court on the procedural errors (Appendix, p. 84).

REASONS FOR GRANTING THE WRIT

1. The Court of Claims Has Exceeded Its Authority in Declaring That the Federal Government Has Rights in Patents Regardless of the Terms of a Contract Governing Such Rights.

The Court of Claims is the only Court having jurisdiction to determine the reasonable and entire compensation to be recovered by a patentee for the unauthorized use by the United States of a patented invention. 28 U.S.C. § 1498(a). In a Petition for a Writ of Certiorari to the Court of Claims, the Solicitor General informed this Court with respect to patent suits in 1970 in the Court of Claims:[8]

> "At the present time, 71 such actions are pending in that court, with an estimated potential liability between $250 million and $500 million."

In many pending cases, the United States has sought to defeat the petitioner's claim on the ground that the patent is licensed to the Government by virtue of a "patent rights" clause contained in a prior contract between the petitioner and the Government.

The "patent rights" clauses are routinely included in Government contracts in standard form.[9] All Army, Navy and Air Force contracts for the purchase of all goods or services, involving research and development are required to contain the "patent rights" clause. In 1965, $4.8 billion was spent by the Department of Defense under research and development contracts.[10]

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[8] *The Garrett Corporation* v. *United States*, October Term 1970, No. 674.

[9] Armed Services Procurement Regulations, ¶ 9-103.

[10] Government Patent Policy Study Final Report, Harbridge House, Inc., Vol. 1, 1968.

The widespread use of the "patent rights" clause, particularly since World War II, is reflected in a number of decisions by the Court of Claims on the issue of whether or not a patent is viewed pursuant to a Government contract containing the standard "patent rights" clause. (*Erie Resistor Corporation* v. *United States,* 279 F.2d 231 (Ct. Cl. 1960); *Ushakoff* v. *United States,* 327 F.2d 669 (Ct. Cl. 1964); *Soundscriber* v. *United States,* 360 F.2d 954 (Ct. Cl. 1966); *Mine Safety Appliances Company* v. *United States,* 364 F.2d 385 (Ct. Cl. 1966); *Eastern Rotorcraft* v. *United States* 384 F.2d 429 (Ct. Cl. 1967); *AMP, Inc.* v. *United States,* 389 F.2d 448 (Ct. Cl. 1968); *Tripp* v. *United States,* 406 F.2d 1066 (Ct. Cl. 1969); *Technitrol, Inc.* v. *United States,* 440 F.2d 1362 (Ct. Cl. 1971)).

This Court has declared, *Hartford-Empire Co.* v. *United States,* 323 U.S. 386, 415, 65 S.Ct. 373, 387 (1945):

> "That a patent is property, protected against appropriation both by individuals and by government, has long been settled."

Although the disposition of patent rights arising out of Government contracts is of national importance involving property rights in the billions of dollars, this Court has not reviewed this subject since *United States* v. *Dubilier Condenser Corp.,* 289 U.S. 178, 192, 53 S.Ct. 554, 559 (1933):

> "The United States is entitled, in the same way and to the same extent as a private employer to shop rights, that is, the free and nonexclusive use of a patent which results from efforts of its employee in his working hours and with materials belonging to the government (Cases cited).

> "The statutes, decisions, and administrative practice negate the existence of a duty binding one in the service of the government different from the obligation of one in private employment."

Even in *Dubilier*, the Court did not review the construction of "patent rights" clauses in Government contracts.

Prior to 1966, the decisions of the Court of Claims involving the allocation of patent rights between the patentee and the Government were consistent with *Dubilier* in requiring a contractual obligation, i.e. a patent rights clause between the parties. The Court found a license to the Government only when the terms of that contractual obligation were fully met. Thus, the Court of Claims' decisions were consistent with *Dubilier, supra*:

> "*Third.* When the United States filed its bills, it recognized the law as heretofore declared; realized that it must, like any other employer, if it desired an assignment of the respondent's rights, prove a contractual obligation on the part of Lowell and Dunmore to assign the patents to the government." (p. 193 of 289 U.S.)

Since 1966, the Court of Claims decisions have developed a broader, "public policy" view that the Government is licensed if there is an "umbilical connection" between the invention and work done under a Government contract (see pages 17 to 20 *infra*). The effect of these decisions is that the Court of Claims has assumed the authority of Congress and transferred to the Government patent rights of great value. This Court, in *Dubilier*, 289 U.S. 178, 208-9, specifically declared that the courts do not have such authority:

> "All of this legislative history emphasizes what we have stated—that the courts are incompetent to answer the difficult question whether the patentee is to be allowed his exclusive right or compelled to dedicate his invention to the public. . . . . . Hitherto both the executive and the legislative branches of the government have concurred in what we consider the correct view,—that any such declaration of policy must come from Congress . . . . ."

The Court of Claims has progressively expanded its authority to declare the extent of Government rights in patents. This Court has not reviewed the scope of authority of the Court of Claims to transfer patent rights to the Government in the absence of contractual or statutory authority. This is an appropriate case for such review.

2. The Law as Developed by the Court of Claims Since 1966 Has Become Unsettled, Thereby Fostering Litigation.

The Court of Claims in *Mine Safety Appliances Company* v. *United States*, 364 F.2d 385, (1966), introduced a principle of liberalization in interpreting the "patent rights" clause (see p. 392 of 364 F.(2d)). The Court openly acknowledged that it was extending the policy of 28 U.S.C. § 1498(a) which expressly applies to inventions made by federal employees, and the policy of *United States* v. *Dubilier Condenser Corp.*, 289 U.S. 178, 188-189, and stated at page 392 of 364 F.(2d):

> ". . . Even in the absence of a patent-license clause in the contract, the same general policy has been applied by this court to give the United States an implied license, as against the contractor-pat-

> entee, to use inventions resulting from a federal experimental and development contract. Ordnance Eng'r Corp. v. United States, 68 Ct.Cl. 301, 352-353 (1929). The same liberality should infuse an express contractual provision like Section 17. In the discussions of the last two-and-a-half decades over the patent policy which the Federal Government should pursue in its contracts, there does not seem to have been much question that the United States is at least entitled to a royalty-free non-exclusive license for practice of inventions made under or in the course of a federal contract."

The Court in *Mine Safety* found that the Government was licensed even though such a license was negated by the express provisions of the contract. Query: Would the contractor have entered into the Government contract, if he had known that the "patent rights" clause would not be applied as its terms clearly state?

In *Eastern Rotorcraft* v. *United States, supra* (1967), the Court considered the effect of the "patent rights" clause on plaintiff's right to recover compensation for use of his invention. Although the patentee had been informed by the Government of the problems which led him to make his invention, the patentee did not enter into a contract with the Government until after he had reduced his invention to practice. The Court found that under the terms of the "patent rights" clause, the Government was not licensed. Furthermore, the fact that the patentee granted a license to an improvement invention did not give rise to an implied license under the earlier patent.

In view of the decision the following year in *Eastern Rotorcraft* v. *United States*, supra, the *Mine Safety Appliance* case could be interpreted as a special situation limited to its own facts. However, in 1968, the Court decided *AMP, Inc.* v. *United States*, supra, where again the Court examined the standard "patent rights" clause and determined that there was no license under the express terms of the clause, but nevertheless the Court held that the Government had an implied license. The only mention of the *Mine Safety Appliance* case appearing in *AMP, Inc.* v. *United States* is in the concurring opinion (p. 456 of 389 F. (2d)).

This liberality of interpretation of the "patent rights" clause was further indicated in *Technitrol, Inc.*, where the Court said (p. 1372 of 440 F.2d):

> "What Mine Safety teaches is that the issue of license *vel non* should be approached liberally by asking what the United States (acting for its taxpayers) can fairly be said to have purchased through its sponsorship of the contract project. The Federal Government has the right to use, royalty free, those ideas, improvements, discoveries, and inventions—crystallized during performance of the federal contract—which have a 'close and umbilical relationship' to the work and research funded by the United States."

The present decision on which this Petition is filed, goes even farther than *Technitrol, supra*, in declaring that privity of contract is unimportant (contrary to *Ushakoff* v. *United States* and *Tripp* v. *United States*, as well as *United States* v. *Dubilier Condenser Corp.*), and that the allocation of patent rights between the parties is not controlled by the patent rights clause of the contract (contrary to *Erie Resistor Corporation* and *Eastern Rotorcraft, supra*).

This present decision gives this Court a unique opportunity to clarify the law on the disposition of patent rights between contractors and the United States, since several contract relationships are involved. This clarification would be in the area where the opinions of the Court of Claims seem irreconcilable. It concerns an area as to which this Court has not spoken, but should, in the interest of clarification of the law.

Petitioner's employer was a party to the 15202 contract and the issue in this case is whether the Government is entitled to a license under the terms of that contract on a basis never claimed by the Government and not tried.

In the second case, (the 20375 contract) Petitioner, Offner, was not a party to the contract, and thus not required by any "patent rights" clause to grant a license to the Government. Petitioner's licensee, Thompson Products, however, held a subcontract containing a "patents rights" clause, under the 20375 contract. The issue here is whether Petitioners, although not parties to any contract here involved, are nevertheless barred from obtaining compensation through an "implied license", or through "joint venture", two alternative theories advanced by the Court, but neither of which was tried nor even made an issue during the trial period.

It should be noted that the decisions of the Court of Claims are followed by various administrative agencies in reviewing the "patent rights" clause in Government contracts to determine the disposition of patent rights administratively, *In re New York University*, ASBCA No. 14,779 (1971), 170 USPQ 101. For example, in *American Nucleonics Corporation*, ASBCA No. 15,370, decided April 17, 1973, the Armed Services

Board of Contract Appeals reviewed the Court of Claims decisions in *Mine Safety, supra,* and *Technitrol, supra,* and stated:

> "The cited Court of Claims cases show that the government's entitlement to a royalty-free license is not dependent on the invention having been conceived or finally reduced to practice in the course of performance of the government contract containing the patent rights clause, if there was a 'close and umbilical connection' between the invention and the government-financed research work."

Thus, the Armed Services Board would no longer rely on the express agreement of the contracting parties, but would decide what the Government should be entitled to get, regardless of the contract provisions.

In ostensibly applying this reasoning to the present case, the Court of Claims goes much further, finding a license to accrue to the Government even though the inventions may have been made outside the scope of any contract.

If the Court of Claims continues to deny just compensation, on any basis other than actual contract, inventors will have no alternative but to conceal their inventions from the Government, to the detriment of National defense.

The decisions of the Court of Claims heretofore have promoted uncertainty,[11] and if anything, have fostered litigation in the Court of Claims because of the reluctance of the Government to settle any case in which there is the possibility of raising a license defense. If the law in this area were clarified, it is reasonable to expect a substantial reduction in the caseload of the Court of Claims.

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[11] See: Davis, (Court of Claims Commissioner in this case) Patent Licenses Under Government Contracts: New Judicial Scrutiny: 55 Journal of Patent Office Society 503-15 (1973).

3. Court of Claims Rules of Practice Are Designed To Safeguard the Private Citizen and Failure of the Court To Apply Its Rules Requires Prompt Corrective Action.

The Court's decision finding a license by reason of the 15202 contract and the 20375 contract without formulating an issue or giving the Petitioners an opportunity to present proofs on the question of license, amounts to taking the Petitioners' property "without just compensation" (U.S. Constitution, 5th Amendment). *United States* v. *Miller*, 317 U.S. 369, 373; 63 S.Ct. 276, 279 (1943):

> "The Fifth Amendment of the Constitution provides that private property shall not be taken for public use without just compensation. Such compensation means the full and perfect equivalent in money of the property taken."

The failure of the Commissioner and the Court to follow its Rules requiring the trial of definite issues, is a denial of due process. A clear statement of the requirements for due process is contained in the Opinion of Mr. Chief Justice Hughes in *Morgan* v. *United States*, 304 U.S. 1, 18, 58 S.Ct. 773, 776 (1938):

> ". . . . . The right to a hearing embraces not only the right to present evidence, but also a reasonable opportunity to know the claims of the opposing party and to meet them."

See also *Jenkins* v. *McKeithen*, 395 U.S. 411, 429, 89 S.Ct. 1843, 1853 (1969).

The Court of Claims acknowledged (Appendix p. 2) that the license defense was not pleaded before trial, but the Defendant merely "raised the possibility of presenting proof". Six months after the trial was concluded, and still without pleading a license defense, the "Defendant submitted a voluminous package of documents", which included the 20375 contract. The Court of Claims found that those documents were "apparently meant, in large part, to be the basis of the license defense." As noted by the Court in its Decision, the Defendant first formulated its license defense in its brief after the close of proof:

> "With their right to reply effectively reserved the plaintiffs received the defendant's brief and recommended findings of fact filed before the commissioner in which the defendant itemized, in detail, [and for the first time] the grounds for its license defense. . . . . .
>
> * * *
>
> "At this point, the plaintiffs had or should have had a clear understanding of the thrust of the defendant's license defense. . . . . ."
>
> (Appendix page 3)

This Court has consistently held that arguments in briefs do not meet the requirements for notices of issues. *Standard-Vacuum Oil Co.* v. *United States,* 339 U.S. 157, 160-161, 70 S.Ct. 545, 547 (1950); *United States* v. *Causby,* 328 U.S. 256, 297, 66 S.Ct. 1062, 1069 (1946); *American Propeller & Mfg. Co.* v. *United States,* 300 U.S. 475, 479, 57 S.Ct. 521, 523 (1937).

The plain import is that the issue of license[12] was not tried and it was not advanced as an issue until the defendant filed its brief with its proposed findings of fact and conclusions of law. This was after the proofs had been closed, as the Court below noted. The Commissioner and the Court should have followed Rule 37(b) *supra* of the Court of Claims Rules and should have held that the plea of a license was waived (Rule 38(h).

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[12] With respect to the 15202 contract, the failure of due process goes even further; the defendant never proposed, even in its brief, that it was entitled to a license under the 15202 contract, but only that the Government was licensed under the 20375 contract. (Appendix, p. 3)

This case indicates a change of direction by the Court of Claims away from its previous decisions that affirmative defenses if unpleaded are waived, in accordance with its rules. Futhermore, this decision fails to follow the clear import of decisions of this court, *supra*.

As recently as 1967 and prior thereto, the Court of Claims has repeatedly rejected arguments based on unpleaded affirmative defenses not fully tried. *Gmo, Niehas & Co.* v. *United States*, 373 F.2d 944 (Ct.Cl. 1967); *Standard Shipbuilding Corporation* v. *United States*, 135 F.Supp. 892 (Ct.Cl. 1944); *Love* v. *United States*, 104 F.Supp. 102 (Ct.Cl. 1952).

All of these cases involved affirmative defenses which were not pleaded and, like the issue of license here raised in the Government's brief, were belated arguments made with respect to such issues and were consistently rejected by the Court.

In the *Niehaus* case, the Court pointed out that the "ten year belated defense" was raised by the Government "in its brief to the Court excepting to the Trial Commissioner's recommendations" (p. 959 of 373 F.(2d)). Here the belated defense of license was raised by the Government twelve years after Petitioners first filed their claim for compensation. It was rejected in Niehaus, but allowed by the Court of Claims here without an adequate opportunity for the Petitioners to present proofs on this decisive issue.

This is a clear violation of the due process provision in the Fifth Amendment and it also portends a trend away from due process by the Court of Claims that should be turned around by this Court's power of supervision and review.

The basis for the Court's decision in thus denying the Petitioners an opportunity to present evidence is that there should be a finality of judgment, but that principle does not outweigh the necessity for due process. It cannot stand as a means of taking Petitioners' property without just compensation. It is a violation of the Fifth Amendment.

RELIEF SOUGHT

The Court should determine whether, under the circumstances, the Government is licensed or has waived the license defense (Rule 38h, *supra*), or in the alternative, to remand the case to the Court of Claims with direction to take proofs on the decisive issue of the license defenses, raised by the Government in its brief.

In *Clayton Chemical & Packaging Co.* v. *United States*, 383 U.S. 821, 86 S.Ct. 1128 (1966), this Court ordered a remand to the Customs Court for further proceedings, including the taking of testimony in lieu of affidavits that were held inadmissible in the Opinion of the Court. There it was noted, the Solicitor General had suggested that the motion to reopen should have been earlier filed. A similar suggestion was made in the Opinion of the Court of Claims here. Nevertheless this Court held that the case should be remanded for the taking of oral testimony necessary to support the findings of fact.

CONCLUSION

The Court of Claims is the people's court. It is the place where private citizens can seek remedy for wrongs by the Government. That Court should not deprive the Petitioners of their patent rights in the absence of an express contract or statute and should not conclude that the Government is licensed without a clear formulation of that issue and a full opportunity to present evidence with respect thereto.

The Petitioners have been deprived of their rights in violation of the Fifth Amendment. This Court should exercise its power of supervision and review.

Respectfully submitted,

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In the United States Court of Claims

No. 174-64

(Decided June 20, 1973)

TECHNICAL DEVELOPMENT CORPORATION AND FRANKLIN P. OFFNER v. THE UNITED STATES

Eugene J. Roberts, attorney of record, for plaintiffs. *Pierce, Scheffler & Parker* and *Irving Hoffman*, of counsel.

Steven Kreiss, with whom was *Assistant Attorney General Harlington Wood, Jr.*, for defendant.

Before COWEN, *Chief Judge*, DAVIS, SKELTON, NICHOLS, KASHIWA, KUNZIG, and BENNETT, *Judges*.

OPINION

PER CURIAM: This case comes before the court from its Trial Division on exceptions of the parties to a recommended decision filed October 1, 1971, by Trial Commissioner James F. Davis, pursuant to Rule 134(h). The court has considered the case on the briefs and oral argument of counsel and, agreeing with the commissioner's decision, adopts the same as the basis for its judgment in the case. Some additional observations, however, are in order, particularly as they relate to a procedural problem arising after the filing of the commissioner's opinion.

Following the filing of the commissioner's opinion in this case, the plaintiffs, on January 5, 1972, filed a motion to refer the case back to the commissioner in order to offer further evidence on the question of the defendant's license defense which was deemed crucial by the commissioner. The court denied this motion without prejudice and ruled that the plaintiffs could renew their contentions with respect to the motion as part of their exceptions to the commissioner's recommended decision. Both parties spent a considerable portion of their arguments addressing the problems of whether the defendant's license defense had been fairly tried, and whether new evidence should be heard on the matter. Since the problem lies at the threshold of any examination of the merits of the case, it is necessary for the court to make a brief, preliminary statement concerning the events leading up to the filing of the commissioner's decision, and the court's conclusions with respect to the plaintiffs' allegations that they must be allowed to present additional evidence if the matter is to receive a fair hearing. The events, as described, are either agreed to by the parties or otherwise supported by the overwhelming evidence before the court.

The defendant never affirmatively pleaded or otherwise raised its license defense before the start of the trial, but instead raised the possibility of presenting proof with respect to such a defense only after the trial had already commenced. Following the disclosure of the possible license defense, there were discussions and correspondence between the parties and the commissioner concerning the scheduling of separate trial proceedings to focus specifically on such a defense. Six months after the regular trial sessions were concluded, the defendant submitted a voluminous package of documents apparently meant, in large part, to be the basis of its license defense, thereby avoiding the necessity of a separate trial. The documents were admitted into evidence by a stipulation between the parties as to their authenticity, and thereafter the proofs were closed.

The first brief and recommended findings of fact presented to the commissioner after the closing of proof were filed by the plaintiffs. In their brief, the plaintiffs recognized the intent of the defendant to rely on the stipulated documents as the basis for its license defense, and went on to state at pages 120–21:

> * * * Plaintiffs are unable to effectively anticipate the position Defendant may take, if any, and the reason therefor and hence, must necessarily reserve the right to include their own appropriate response in a Reply Brief * * *.

With their right to reply effectively reserved, the plaintiffs received the defendant's brief and recommended findings of fact filed before the commissioner in which the defendant itemized, in detail, the grounds for its license defense. The plaintiffs responded in their reply brief with an exhaustive attempt to refute, on the merits, each of the defendant's license allegations. This response was prefaced by the following statement at page 18 of the reply brief:

> It is submitted that, in view of the full opportunity granted Defendant to call any and all witnesses desired, and at any place it might have specified, and its failure to do so, the evidence should be construed to prove nothing beyond that strictly contained within the documents, and that extended inferences be proscribed.
>
> If, however, there should be any doubt as to the validity of Plaintiffs' position, based on such a strict construction of the evidence, Plaintiffs would in no way object to the reopening of the proofs, so that each side could introduce such additional testimony and documents as might bear on an incontrovertible proof of the facts of the case.

At this point, the plaintiffs had or should have had a clear understanding of the thrust of the defendant's license defense, and were apparently content to rest on the arguments contained in their reply brief. Their prefatory statement that should there "be any doubt as to the validity of Plaintiffs' position * * * Plaintiffs would in no way object to the reopening of the proofs" does not constitute a request to be allowed to present new evidence, much less a demand for such an opportunity. It instead appears to be an attempt by the plaintiffs to preserve their right to present contradictory affirmative evidence, but only if the commissioner should reach the conclusions being pressed by the defendant. Such a position is untenable, and incompatible with the principle of certainty in judicial determinations and that once fair opportunity is provided for presentations of evidence and argument, litigation should have an end.

The facts make it clear that the license defense was effectively tried with mutual consent of the parties, and, therefore, despite the fact that the defense was not affirmatively pleaded [a procedure preferred by the court (Rule 37(a)], Rule 39(b) allows the court to treat the pleadings as though amended in order to conform to the proof. *See United States Fid. & Guar. Co.* v. *United States*, 389 F. 2d 697, 698–99 (10th Cir. 1968), in which Fed. R. Civ. P. 15(b) [the parallel to Court of Claims Rule 39(b)] was used to reach the following conclusion:

> * * * Where no objection is made to evidence on the ground it is outside the issues of the case, the issue raised is nevertheless before the trial court for determination, [cites omitted], and the pleadings should be regarded as amended in order to conform to the proof. [Citations omitted.]

The cases cited by the plaintiffs, *Armstrong Cork Co.* v. *Lyons*, 366 F. 2d 206 (8th Cir. 1966), and *Freitag* v. *Strand of Atlantic City, Inc.*, 205 F. 2d 778 (3rd Cir. 1953), are cases in which the circuit courts reversed decisions below which were based upon issues neither pleaded by the parties nor tried with their consent. This is clearly not the situation presented by the case at hand, where it is clear from the briefs before the commissioner that both parties presented their positions on the license issue, on the merits, expecting the commissioner to reach a conclusion on the merits. The conclusions the commissioner reached were not word for word repetitions of the theories presented by the defendant, but they were closely enough related to those theories to be predictable to the parties concerned. Since the plaintiffs are not alleging that the additional evidence which they wish to present is "new" in the sense that it was unavailable at the time of the trial, there appears to be no compelling reason for the court to remand the case to the commissioner in order to hear more evidence on a matter already closed to proof.

A further preliminary addition should be noted at this point. The commissioner described two alternative bases for finding that the defendant was licensed to use the inventions defined by claims 11 and 35 of Patent 2,697,908. As to the first, the court emphasizes its particular reliance on the implied license as grounds for defendant having a right to use the invention in question because it is very clear that defendant would still win even if the court were to grant plaintiff's motion to reopen and to consider all the evidence now proffered in that motion. Alternatively, the court adheres to the joint venture basis also relied upon by Trial Commissioner Davis, on the basis of evidence before him. The trial commissioner's adopted opinion and findings are set forth below, followed by the court's conclusions of law in which claims 3, 4 and 5 of Patent No. Re. 24,809 and claims 11 and 35 of Patent 2,697,908 are dismissed, and the case is remanded to a trial commissioner for further proceedings.

OPINION OF THE TRIAL COMMISSIONER

Davis, *Commissioner:* This is a patent suit under 28 U.S.C. § 1498. Plaintiffs seek "reasonable and entire compensation" for alleged unauthorized use by the United States of inventions described and claimed in two patents owned by Franklin F. Offner. Offner is the inventor of both patents. Technical Development Corporation is Offner's exclusive licensee and coplaintiff in this suit.

The patents relate to electronic fuel control systems, particularly suitable for use with jet aircraft engines. No. Re. 24.809 (the '809 patent) is entitled "Electronic Engine Speed Control System." It was granted in 1960 as a reissue of Patent No. 2,662,372 (the '372 patent) which in turn was granted in 1953 on an application filed in the U.S. Patent Office in 1947. No. 2,697,908 (the '908 patent) is entitled "System for Accelerating Engines to Selected Speeds and Maintaining the Speed Selected." It was granted in 1954 on an application filed in the U.S. Patent Office in 1949. Plaintiffs contend that claims 3, 4 and 5 of the '809 patent are infringed by the fuel control system of jet engine designated J–47, manufactured for the United States by the General Electric Company; and that claims 11 and 35 of the '908 patent are infringed by the afterburner fuel control system of jet engine designated J–85, likewise manufactured for the United States by the General Electric Company. The parties agreed to defer accounting, if any, to later proceedings.

Defendant raises the usual issues of patent invalidity and noninfringement. It also contends that the United States is licensed under both patents by virtue of Patent Rights clauses in two Government contracts performed during the 1940's. Trial was held on all issues, though much of the evidence relating to the license defense was introduced by way of documents stipulated into the record by the parties after the last trial session and before proofs were closed. After careful review of the record and on the basis of the detailed findings of fact and the ultimate findings and conclusions accompanying this opinion, I hold that the United States is licensed under both patents. Accordingly, the issues of validity and infringement are not reached. *Mine Safety Appliances Co.* v. *United States*, 176 Ct. Cl. 777, 364 F. 2d 385, 150 USPQ 453 (1966).

Background and patents in suit

To understand the inventions, it is necessary to describe briefly the fundamentals of gas turbine operation. A gas turbine engine, and in particular a jet aircraft engine, comprises a cylinder-like housing, open at both ends, in which is mounted (a) a series of air compressors toward the forward end of the housing, (b) a combustion chamber aft of the compressors, and (c) a gas turbine aft of the combustion chamber. The turbine and compressors rotate about a common axis. In operation, air enters the engine through the front open end of the housing and is compressed through a series of compression stages by the air compressors. The compressed air is fed into the combustion chamber wherein fuel is injected, ignited and burned. The hot combustion gases thus produced expand rearwardly through the turbine, which drives the compressors, and exit out the rear end of the engine, thereby creating thrust which drives the engine (and aircraft) forward.

The '809 patent[1] discloses three interrelated electronic circuits for regulating the fuel valve of a gas turbine engine to control engine speed, acceleration and temperature. Patent claims 3, 4 and 5 relate only to the speed and temperature control circuits. In essence, the speed control circuit functions to open or close the engine's fuel valve in response to commands (by, *e.g.*, an aircraft pilot) for increased or decreased engine speed. The temperature control circuit, more accurately called a temperature "override" circuit, functions to reduce fuel flow whenever a preselected maximum exhaust gas temperature is exceeded, so to protect the engine (and particularly the turbine) from structural damage due to excessive temperatures. The speed control circuit and the temperature override circuit thus operate in conjunction with each other to regulate engine speed while at the same time ensuring that exhaust gas temperature stays below a preselected maximum.

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[1] The disclosure and claims of both the '809 and '908 patents are long and complex and are set out in detail with drawings in findings 5 to 8. This opinion is a summary, in sufficient detail to understand the issues.

The '908 patent discloses an improvement on the control system of the '809 patent. Like the '809 patent, the '908 patent describes three interrelated electronic circuits for controlling engine speed, acceleration and temperature. The speed control circuit and the temperature override circuit, for purposes here material, are substantially the same as the corresponding circuits in the '809 patent. The principal difference is the acceleration control circuit. In essence, the improved acceleration control circuit operates during engine acceleration to regulate fuel flow as a function of exhaust gas temperature modified by the temperature of air coming into the engine. To explain, it is desirable during acceleration of the engine to maintain a high rate of fuel flow so that full engine speed is reached quickly. However, in order to protect the turbine from excessive temperatures during acceleration, it is necessary not to exceed the preselected maximum exhaust gas temperature. The acceleration control circuit of the '908 patent is designed to accommodate both of these requirements (*i.e.*, rapid acceleration below excessive temperatures) by scheduling fuel flow, during acceleration, as a function of exhaust gas temperature limited by the maximum permissible exhaust gas temperature. That is to say, as long as exhaust gas temperature stays below the preselected maximum, the engine is permitted to accelerate at maximum fuel flow. But if the preselected maximum exhaust gas temperature is exceeded, fuel flow is reduced.

Furthermore, on very cold days or at high altitudes (where air temperature is relatively low), it is often desirable to reduce engine acceleration rate (and thus fuel flow) so to prevent a phenomenon called compressor surge or stall. The acceleration control circuit of the '908 patent prevents compressor surge or stall by lowering the maximum permissible exhaust gas temperature in accordance with the temperature of air coming into the engine. At very low air inlet temperatures, the maximum permissible exhaust gas temperature is reduced, so to limit the rate of acceleration of the engine. Claims 11 and 35 of the '908 patent define the invention as a "device for controlling acceleration of a combustion gas turbine engine" wherein fuel flow is regulated during engine acceleration by a first "signal voltage variable with the temperature of the combustion gases" which first "signal voltage" is modified by a second signal voltage representative of "air temperature at the air inlet to * * * the compressor." The second signal voltage effects an "apparent increase in said [first] signal voltage upon a decrease in compressor air inlet temperature."

The inventions defined by the patent claims in suit find their genesis in an electronic fuel control system developed by Offner over the four-year period 1944 to 1948. Offner first learned of the need for improved gas turbine fuel controls in 1943 from Government personnel at Wright Field, Dayton, Ohio. At that time, the military was developing a gas turbine engine for high-performance jet aircraft. Utilizing his own time and funds as well as those of his small electronics company in Chicago (Offner Electronics Inc.), Offner in 1944 built several primitive models of an electronic fuel control system incorporating a speed control circuit and a simulated temperature override circuit. He tested the models in his laboratory on gas turbine simulators. No actual gas turbine or jet aircraft engines were then available to him.

In early 1945, Offner visited the Power Plant Laboratory at Wright Field with a view to soliciting Governmental interest in the concepts of his control system. On March 14, 1945, he submitted a proposal to the Air Technical Service Command (ATSC) at Wright Field for the "development of an electronic control for jetpropelled aircraft." The proposal was to furnish four units, one unit to be a "pilot unit incorporating variable controls for all necessary factors in order to determine optimum values" and three other units to be "suitable for installation in aircraft and flight test." Also, Offner proposed to submit engineering reports after testing of the units. Personnel at ATSC indicated interest in the proposal; and between March and June 1945, Offner developed and built a model control unit for preliminary tests on a jet engine. In June 1945, Offner took the model to Wright Field and ran tests on a jet engine bench installation. The model incorporated a speed control circuit and a temperature override circuit. However, only the speed control circuit was connected to the engine and tested under actual engine operating conditions. Tests with the temperature override circuit were simulated in a manner much like Offner's earlier laboratory work. The tests showed that the control unit, though still in the development stage, had potential for further bench and flight testing.

Following the test in June 1945, Offner did further development on his control system. In early 1946, he wrote a report which summarized the general principles, advantages and possible modes of use of electronic controls for jet engines. A copy of the report was sent to ATSC at Wright Field. On March 7, 1946, ATSC requested Offner Electronics Inc. to provide quotations for a jet engine fuel control system to provide "full range speed control, acceleration and deceleration control * * * [and] temperature control * * *." On March 29, 1946, Offner wrote to ATSC offering to develop and build such a fuel control, but noted that the delivery schedule requested by ATSC made it impossible "to do the complete development of the units as we would wish to insure stable control under all conditions * * * The controls will be suitable for flight testing altho they will not be final flight models."

On June 20, 1946, Offner Electronics Inc. and the United States entered into a contract (W33-038 ac 15202) for developing and building an electronic fuel control for the J-33 turbojet engine, the control to be "suitable for engine and flight tests." The contract was in reality a development contract since it set out only performance specifications and called for the contractor to provide a "Final Report * * * covering all details of design, development and testing of the * * * control." The contract included a Patent Rights clause by which the contractor agreed to grant to the United States a license to any inventions "conceived or first actually reduced to practice * * * in the performance of the contract." Between June and December 1946, Offner and Offner Electronics Inc. proceeded to develop and build a fuel control pursuant to the contract. Sometime before November 1946, Thompson Products, Inc., of Cleveland, Ohio, became interested in the project and supplied Offner with some of the mechanical elements for the control. Also, Offner visited the Allison Division of General Motors Corporation, Indianapolis, Indiana, to discuss arrangements for testing the control on a J-33 gas turbine engine. At that time, Allison was working with the Government to develop the J-33 engine for military aircraft.

In December 1946, Offner completed the fuel control called for by the contract. The control was sent to Allison, where, in January 1947, it was operably connected up to a J-33 turbojet engine and successfully bench-tested (but not flight-tested). The control included, among other things, the speed control circuit and the temperature override circuit, substantially as disclosed and claimed in the patent application later filed in August 1947, which application matured into the '372 patent, and finally, the reissue '809 patent here in suit. The control was again successfully bench-tested at Wright Field in May 1947 on a J-35 turbojet engine. In a report covering the May 1947 test, it was concluded that the "power control system demonstrated very promising possibilities in control of the J-35-C3 turbo-jet engine." Contract W33-038 ac 15202 was deemed completed in late May 1947 upon delivery of the control unit by Offner to the Government.

Sometime after mid-1946 and while Offner was developing the fuel control under Contract W33-038 ac 15202, Offner and Thompson Products, Inc. decided to collaborate in their efforts to pursue further development of the Offner control. On March 5, 1947, Offner Electronics Inc. and Thompson Products entered into a contract by which Thompson Products got an exclusive license under Offner's fuel control inventions (and any patents which might be granted thereto); and Thompson Products agreed to manufacture fuel control systems using electronic components developed and built by Offner Electronics Inc. The control units were thereafter referred to as the "Thompson-Offner fuel system." On March 21, 1947, a meeting was held at the Power Plant Laboratory, Wright Field, to discuss a program for testing fuel control systems on jet engines then under development by Allison for the Government. Offner attended the meeting along with representatives of Allison, Thompson Products and the Government. The upshot of the meeting was that Allison was to be responsible for procuring and testing fuel controls for its jet engines, one such control to be the Thompson-Offner fuel system. Several days later, Thompson Products submitted a proposal to Allison to furnish the Thompson-Offner fuel system for testing. Allison in turn submitted a proposal to the Government for "* * * Procurement and Testing of Five (5) Thompson-Offner Turbo-Jet Engine Controls." The proposal noted that "* * * it should be recognized that this is a joint research and development program on new type controls involving the Government, control manufacturers, and this contractor; which no doubt will incur numerous changes in design which we will have to negotiate from time to time." After negotiations extending throughout the balance of the year 1947 and early 1948, Allison and the United States, on March 15, 1948, entered into Contract W33-038 ac-20375 for "Electronic Power Controls, Tests, Reports and Data." The contract provided for procuring, testing (both bench tests and flight tests), and evaluating the Thompson-Offner fuel system, as well as a competing system then under development, known as the Eclipse-Pioneer control. The Government was to furnish the jet engines for the tests. The contract contained a Patent Rights clause similar to the one in the earlier Offner-United States contract.

Then, on May 11, 1948, Allison entered into a subcontract with Thompson Products, pursuant to the terms and conditions of the principal contract, including the Patent Rights clause. Neither Offner nor Offner Electronics Inc. was a signatory to the Allison-Thompson Products subcontract. However, Offner received a copy of the subcontract, and he continued to collaborate with Thompson Products in all phases of development, testing and reporting required by the subcontract's terms. Furthermore, Thompson Products and Offner agreed to split the proceeds payable under the subcontract ($48,900) on the basis of 55% to Thompson Products and 45% to Offner Electronics Inc. Offner Electronics Inc. in fact received $21,305 as its share of the subcontract price.

Meanwhile and during the time negotiations were going on among Allison, Thompson Products, Offner, and the Government, Offner and Thompson Products, partly in anticipation of the forthcoming contract, continued to develop the Thompson-Offner fuel system. In late 1947–early 1948, Offner conceived the idea of the acceleration control circuit, modified by the compressor surge or stall circuit, as later disclosed and claimed in the '908 patent. In early 1948, Offner built a test circuit and ran some preliminary bench tests on a simulated turbine. No tests were run at that time on an actual gas turbine or jet aircraft engine. In January 1948, Allison shipped to Muroc Air Base, Muroc, California, one Thompson-Offner fuel system for flight tests. Shipment was made prior to completion of contract negotiations in order to expedite the in-flight test program of the Thompson-Offner control. Personnel of Thompson Products and Offner Electronics Inc. went to California to supervise and oversee installation and flight tests of the fuel control. Flight tests were conducted with Air Force planes and with the assistance of Government personnel and material. The Thompson-Offner control, as first flight-tested in mid-1948, included, among other things, the speed control circuit and the temperature override circuit, substantially as disclosed in the '809 patent, but did not include the acceleration control circuit, modified by the compressor surge or stall circuit, as described in the '908 patent. Flight testing continued throughout the spring and summer of 1948. Offner was present in California during much of the testing, and in fact was the principal representative of the Thompson Products-Offner Electronics Inc. interests part of the time. Sometime before September 1948, the Thompson-Offner fuel system, then being flight-tested at Muroc Air Base, was modified by Offner to include the acceleration control circuit, later described in the '908 patent; and shortly thereafter, the circuit was successfully flight-tested. Flight tests on the Thompson-Offner control terminated in September 1948, at which time flight tests were commenced by Allison and the Government with the Eclipse-Pioneer control.

License issue; the '809 patent

Against this factual backdrop, defendant contends that the United States is licensed under the inventions of the '809 patent. While not contending that the inventions were "conceived" in performance of Contract W33–038 ac 15202, defendant says they were "first actually reduced to practice" in such performance and within the meaning of that contract's Patent Rights clause. Defendant argues that the first actual reduction to practice occurred during flight tests at Muroc Air Base in 1948, and cites a line of case law which holds that inventions relating to aircraft and aircraft components must be flight-tested in order to constitute an actual reduction to practice (*e.g.*, *Gaiser* v. *Linder*, 253 F. 2d 433, 117 USPQ 209 (CCPA 1958); *Chandler* v. *Mock*, 150 F. 2d 563, 66 USPQ 209 (CCPA 1945)). Plaintiffs, on the other hand, contend that conception of the inventions occurred in 1944 and that actual reduction to practice occurred shortly thereafter, in 1944 or at the latest 1945, *i.e.*, by virtue of Offner's early laboratory work in 1944 or the bench tests at Wright Field in 1945, all of which occurred before the date of Contract W33–038 ac 15202 (June 20, 1946). I conclude, for reasons stated in detail in ultimate findings 53–56, that the inventions defined in claims 3, 4 and 5 of the '809 patent (a) were conceived, within the meaning of the patent law, sometime between July 25, 1944 and December 1946, and (b) were first actually reduced to practice in January 1947 in tests conducted at Allison. Offner's tests in 1944 and 1945 did not meet the requirements for an actual reduction to practice because they failed to show that the speed control circuit and the temperature override circuit of the fuel control system developed up to those dates were operable under actual service conditions of a gas turbine engine (or any other practical device), or under conditions adequately simulating actual service conditions. (Finding 54(b) and (c).) However, the tests at Allison in January 1947, though not flight tests, were adequate to show such operability. (Finding 54(d).)

Accordingly, since the tests conducted in 1947 constituted the first actual reduction to practice of the inventions claimed in the '809 patent and were "in performance of" Contract W33–038 ac 15202, the United States is fully licensed by virtue of that contract's Patent Rights clause.

License issue; the '908 patent

The parties do not dispute that the inventions defined by claims 11 and 35 of the '908 patent were first actually reduced to practice in 1948 during flight tests at Muroc Air Base. Nor is there any question that those flight tests were conducted during the term of, and in performance of, the United States-Allison principal contract and the Allison-Thompson Products subcontract. The parties part company, however, over two points: (a) Whether Thompson Products, as a subcontractor to Allison, was bound by the Patent Rights clause of Allison's principal contract with the United States, and (b) if Thompson Products was so bound, whether Offner and Offner Electronics Inc., by virtue of their relationship with Thompson Products, also became bound by such Patent Rights clause.

With respect to point (a), I conclude, as noted in ultimate finding 59, that Thompson Products became bound by the Patent Rights clause of Contract W33–038 ac–20375 when it became a subcontractor to Allison. The Allison-Thompson Products subcontract, styled a "Purchase Order," stated that it was "in accordance with U.S. Air Force Contract No. W33–038 ac 20375 and [two] Thompson Products' proposals," and the work called for under the subcontract was in language identical to the United States-Allison contract. Furthermore, the subcontract expressly noted Article 41 (the Patent Rights article) of the principal contract; and although Article 41 was not set out *in haec verba* in the subcontract, the clear intent was that the subcontract was let pursuant to the patent rights and obligations of Article 41. Moreover, the record shows that Thompson Products, the principal party against whose interests the clause applied, considered itself bound by the Patent Rights clause of the United States-Allison contract. In 1950, after completion of work under the subcontract, Thompson Products informed the United States, through the Air Materiel Command at Wright Field, that it had made "no 'subject invention' as defined in Purchase Order H–2076 [the Allison-Thompson Products' subcontract]" during performance of the subcontract. Reference to "subject invention" could only have meant Article 41 of the United States-Allison contract. (Finding 52)

With respect to point (b), I conclude, for reasons stated in detail in ultimate findings 61–63, that the relationship of Offner, Offner Electronics Inc. and Thompson Products was that of joint adventurers in performing the Allison-Thompson Products subcontract. And as joint adventurers, Offner and Offner Electronics Inc. were bound by the patent rights and obligations of the subcontract to the same extent as Thompson Products. Although, as earlier noted, neither Offner nor Offner Electronics Inc. was a signatory to the Allison-Thompson Products subcontract, the record shows that Offner, Offner Electronics Inc. and Thompson Products were coentrepreneurs in discussions and negotiations with the Government leading to the principal contract and the subcontract; that they were joint participants in developing, testing and reporting on the Thompson-Offner fuel system; that they agreed to share in the proceeds of the subcontract (implicit in which was the sharing of profit or loss) derived from the United States through Allison; and that they in fact shared such proceeds. The case law cited in ultimate findings 61 and 62 clearly labels this relationship as one of joint adventure.

Alternatively, I conclude, for reasons stated in ultimate finding 64, that the United States is entitled to an implied license under claims 11 and 35 of the '908 patent, irrespective of the precise nature of the relationship between Offner and Offner Electronics Inc., and Thompson Products. Offner and Offner Electronics Inc. were intimately involved with all phases of performance of the Allison-Thompson Products subcontract; intended to be paid from Government contract funds; and in fact were paid for a substantial part, if not all, of the development work done on the Thompson-Offner fuel control, during the term of the principal contract and subcontract, by funds derived from the United States. As stated in *Mine Safety Appliances Co.* v. *United States*, *supra*:

> * * * "Inventions made under a Government contract are the product of expenditures from the public treasury in the course of a governmental function; the public, having in a sense ordered and paid for the invention through its representatives, should not again be taxed for its use, nor excluded from its use, nor permitted to use it upon restrictive conditions advantageous to no

> one but the patent owner." [footnote omitted] * * * Even in the absence of a patent-license clause in the contract, the same general policy has been applied by this court to give the United States an implied license, as against the contractor-patentee, to use inventions resulting from a federal experimental and development contract. * * *. [176 Ct. Cl. at 789, 364 F. 2d at 392.]

See also Ordnance Eng'r Corp. v. *United States*, 68 Ct. Cl. 301 (1929), *cert. denied*, 302 U.S. 708 (1937), where this court said at 353:

> * * * Except for the development processes carried on at the expense of the Government, under its supervision and with its suggestions in collaboration and contractual relationship with the plaintiff, these patents would not have come into existence. * * *

FINDINGS OF FACT

1. This is a patent suit under 28 U.S.C. § 1498. Coplaintiffs, Technical Development Corporation, Inc., and Franklin F. Offner, seek reasonable and entire compensation for alleged unauthorized use by defendant, the United States, of inventions described and claimed in two U.S. patents:

> No. Re. 24,809 (hereafter the '809 patent), entitled "Electronic Engine Speed Control System," issued to F. F. Offner on April 12, 1960, on an application filed May 23, 1955. The '809 patent is a reissue of Patent No. 2,662,372 (hereafter the '372 patent) which issued on December 15, 1953, on an application filed August 27, 1947.
>
> No. 2,697,908 (hereafter the '908 patent), entitled "System for Accelerating Engines to Selected Speeds and Maintaining the Speed Selected," issued to F. F. Offner on December 28, 1954, on an application filed March 31, 1949.

Offner owns both patents. Technical Development Corporation, an Illinois corporation having its principal place of business at Chicago, is the exclusive licensee under both patents.

2. The petition was filed in this court on June 10, 1964, and was amended on January 24, 1967. As amended, the petition alleged unauthorized use by the United States of the '809, '908 and '372 patents, as well as U.S. Patents 2,517,703 and 3,082,954. By agreement of the parties, Patent 2,517,703

was withdrawn from the suit. By stipulation filed August 28, 1968, the parties further agreed as follows:

> 1. The parties agree that the initial trial to begin on or about September 3, 1968, will be restricted to claims 3, 4 and 5 of Reissue Patent No. 24,809 all of which relate to the electronic fuel control system for the J47 engine, and to claims 11 and 35 of Patent No. 2,697,908 which relate to the electronic control system for the afterburner section of the J85 engine.
>
> 2. The parties agree that Patent No. 3,082,954 is to be considered as having been withdrawn from suit with prejudice.
>
> 3. The parties agree that claims 12, 14 and 37 of Patent No. 2,697,908 are to be considered as having been withdrawn from suit with prejudice.
>
> 4. The parties agree that if any of claims 3 to 5 of Reissue Patent No. 24,809 are held to be valid and infringed by the Court (as distinguished from the Commissioner) there will be no further trial proceedings irrespective of how the Court (as distinguished from the Commissioner) rules with respect to claims 11 and 35 of Patent No. 2,697,908.
>
> 5. If all of claims 3 to 5 of Reissue Patent No. 24,809 are held to be invalid or non-infringed, then the parties further agree that the trial will be resumed with respect to all issues involved in suit with respect to claims 2, 9, 19 and 25 of Reissue Patent No. 24,809, and claims 1 and 10 of Patent No. 2,697,908.
>
> * * * * *

Accordingly, the claims presently at issue are as follows:

> Claims 3, 4 and 5 of the reissue '809 patent (which correspond to like-numbered claims in the parent '372 patent); and
>
> Claims 11 and 35 of the '908 patent.

3. By agreement of the parties, the accounting issues, if any, are deferred until resolution of the liability issues.

4. Plaintiffs allege that claims 3, 4 and 5 of the '809 patent are infringed by the electronic fuel control system of jet aircraft engine designated J-47, at least one of which was procured from the General Electric Company and used by the United States during the pertinent accounting period. Plaintiffs further allege that claims 11 and 35 of the '908 patent are infringed by the electronic afterburner fuel control system of jet aircraft engine designated J-85, at least

one of which was procured from the General Electric Company and used by the United States during the pertinent accounting period.

5. The invention described in the '809 patent relates to electrical circuits for controlling the fuel input to gas turbine engines, particularly jet aircraft engines. Generally and by way of background, a jet aircraft engine comprises a cylindrical housing, open at both ends, in which is located (a) a series of air compressors toward the forward end of the housing, (b) a combustion chamber aft of the compressors, and (c) a gas turbine aft of the combustion chamber. The turbine and compressors rotate about a common axis. In operation, air enters the engine through the front open end of the housing and is compressed through a series of compression stages by the air compressors. The compressed air is then fed into the combustion chamber wherein fuel is injected, ignited and burned. The hot combustion gases thus produced expand rearwardly through the turbine, which drives the compressors, and out the rear end of the engine, thereby creating thrust which drives the engine (and aircraft) forward.

The speed of rotation of the compressors and turbine, as well as the thrust created by rearward expansion of hot combustion gases, depends on the fuel input to the combustion chamber. Simply stated, the more fuel, the greater the speed of rotation and thrust. In essence, the '809 patent describes three interrelated electrical circuits which control fuel input to the combustion chamber: (1) a "speed control" circuit which regulates the speed of the engine at or near flying speed, (2) an "acceleration control" circuit which regulates the acceleration rate of the engine when going from idling speed up to flying speed, and (3) a "temperature override" circuit which prevents overheating of, and possible damage to, the turbine and tailpipe by hot exhaust gases. Patent claims 3, 4 and 5 deal only with the speed control circuit and the temperature override circuit. Accordingly, the acceleration control circuit, though noted below, need not be described in detail.

(a) *Speed control circuit*—The function of the speed control circuit is to move the engine's fuel valve to a more-open or more-closed position, in response to desired aircraft speed changes. The circuit works on the null-balance principle and is best described with reference to Figs. 1 and 2 of the patent, reproduced herein. A small electrical generator 1 is coupled to the jet engine shaft and is driven by the engine. Through circuitry shown in Fig. 2, the generator produces a negative voltage at point 8, the magnitude of which is proportional to the actual speed of the engine. By means of a bridge circuit 11, the negative voltage created by the generator is compared to a positive voltage which is representative of a desired engine speed. The magnitude of the positive voltage depends on the setting of slide wire potentiometers 16 and 17 which, in effect, are set by the aircraft pilot in calling for higher or lower engine speed. Any difference between the magnitudes of the positive and negative voltages is reflected as an error voltage (positive or negative) at point D of bridge 11, such difference thus being proportional to the magnitude and sense (positive or negative) of the difference between the actual speed of the engine and the desired speed. The error voltage is amplified by amplifier 37 and fed to solenoid control 54 which, in turn, moves fuel valve 66 to a more-open position (when the error voltage is positive) or to a more-closed position (when the error voltage is negative). The engine then either speeds up or slows down so as to reduce the error voltage at point D to zero. When the error voltage at point D is zero, the engine's actual speed is the same as the desired speed. This, in essence, is the null-balance principle.

(b) *Temperature override circuit*—The function of the temperature override circuit is to prevent fuel flow to the engine at a rate so high that the resultant exhaust gas temperature may damage the engine parts, particularly the turbine or tailpipe. With reference to patent Figs. 1 and 2, a temperature sensitive resistor 98 (Fig. 2) is located in the jet engine tailpipe. The electrical resistance of resistor 98 is a function of exhaust gas temperature. Resistor 98 is

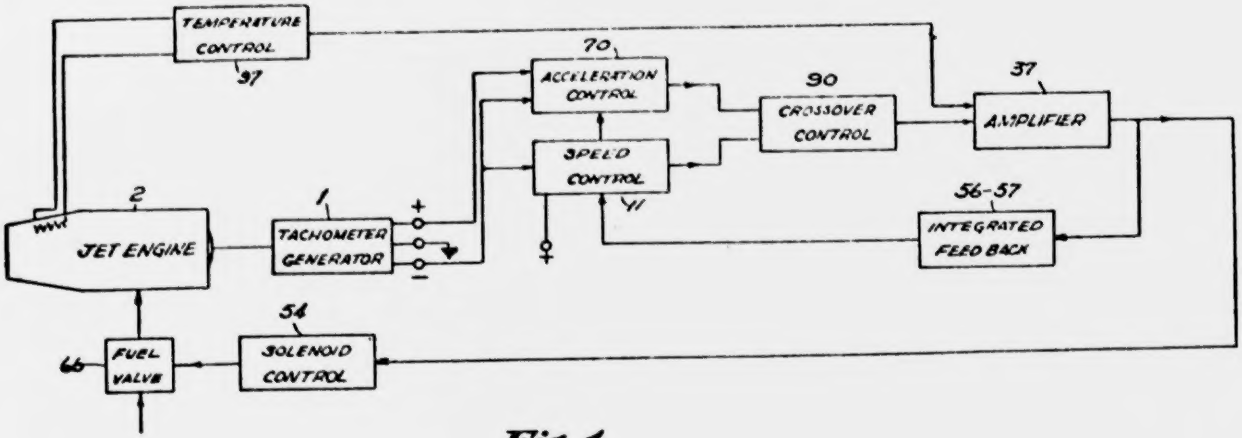
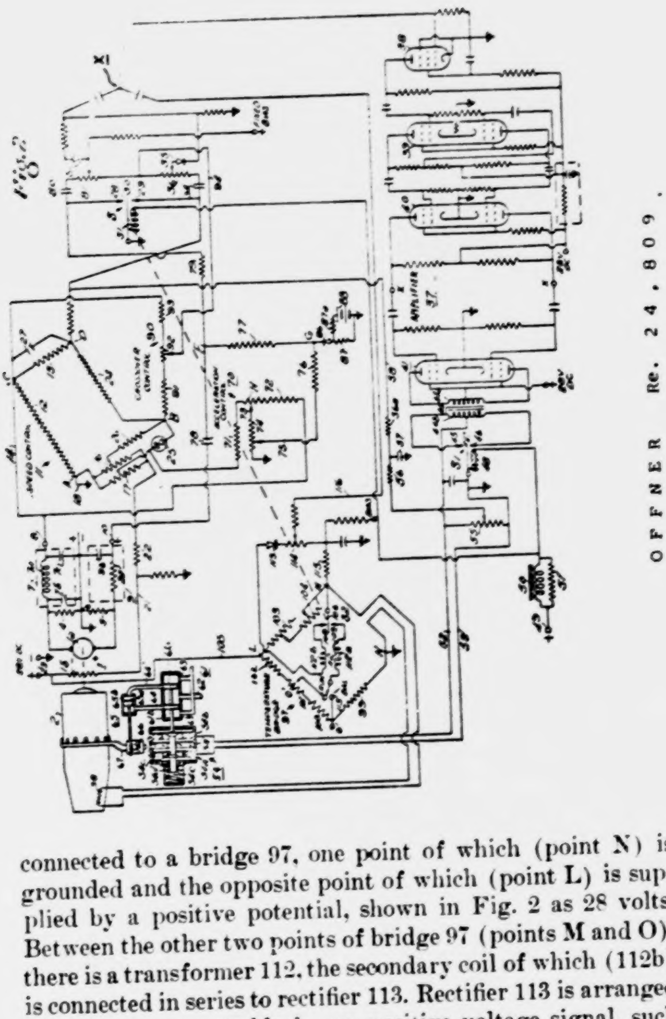

TEMPERATURE CONTROL
97
70
ACCELERATION CONTROL
90
CROSSOVER CONTROL
37
AMPLIFIER
SPEED CONTROL
71
56-57
INTEGRATED FEED BACK
2
JET ENGINE
1
TACHOMETER GENERATOR
+
−
54
SOLENOID CONTROL
66
FUEL VALVE

Fig. 1

OFFNER Re. 24,809



connected to a bridge 97, one point of which (point N) is grounded and the opposite point of which (point L) is supplied by a positive potential, shown in Fig. 2 as 28 volts. Between the other two points of bridge 97 (points M and O), there is a transformer 112, the secondary coil of which (112b) is connected in series to rectifier 113. Rectifier 113 is arranged by polarity so as to block any positive voltage signal, such signal being representative of temperatures in the tailpipe below a desired maximum (*e.g.*, 1,500° F.). Bridge 97 is calibrated, by means of variable resistors 101, 103 and 104, so that the bridge is balanced (and thus produces no error signal) when the resistance of resistor 98 corresponds to the maximum temperature permitted in the tailpipe (*e.g.*, 1,500° F.). Thus, a temperature in the tailpipe lower than the permitted maximum will cause bridge 97 to become unbalanced and develop a positive voltage signal, which signal is blocked by rectifier 113 and has no effect on fuel input. If, on the other hand, the tailpipe temperature exceeds the selected maximum, the bridge is unbalanced in the opposite direction with a resultant negative error signal. The negative error signal is directly combined at point *X* with the speed error signal: and the combined signal is then amplified by amplifier 37 and fed to solenoid 54 which regulates fuel valve 66. The temperature override circuit is designed so that the magnitude of the negative error signal created through bridge 97 by an overtemperature condition is sufficiently large to override any positive error signal produced by the speed control circuit, which means simply that if an overtemperature condition arises in the tailpipe while the speed control circuit is calling for more fuel, the fuel valve will nevertheless tend to close.

(c) *Acceleration control circuit*—The acceleration control circuit, which is not covered by claims 3, 4 or 5 and thus need not be discussed in detail, functions to control fuel flow from engine idling speed up to about 80 percent of the engine's full speed, after which the speed control circuit takes over. Thus, the acceleration control circuit and the speed control circuit function at different times, with "crossover" from one circuit to the other occurring at about 80 percent of full speed.

(d) In addition to the basic circuitry above described, the control systems include circuit components to provide an integrated feedback network (shown diagrammatically in Fig. 1) and a derivative stability circuit (including capacitor 27) to ensure that the system remains stable during operation.

6. Claims 3, 4 and 5 are set out below in outline form for ease of understanding and with bracketed inserts to tie the claim language to the structure of Figs. 1 and 2.

3. In an electrical speed control of the automatically rebalancing type,
means [generator 1 and bridge 11] producing a voltage signal [at point D] whose magnitude and

polarity are determined by the magnitude and sense of the departure in speed of a rotating member [turbine] from a given speed,

an electrically controlled speed adjusting device [fuel valve 66] for the member responsive to said signal for altering the speed of the member in such sense as to reduce the signal to zero,

means [including resistor 98 and bridge 97] controlled by an operating parameter of the rotating member other than speed [*e.g.*, temperature] for producing a second signal upon an increase in the magnitude of said other operating parameter [*i.e.*, temperature] above a preselected magnitude, and

circuit means [including rectifier 113, resistor 114 and amplifier 37] applying said second signal to said speed adjusting device, said second signal having a polarity such as to effect a reduction in speed of the member.

Claim 4 is essentially the same as claim 3, except that the "operating parameter * * * other than speed" is specified to be "temperature."

5. In an electrical speed control of the automatically rebalancing type for a rotating member [turbine],

means [generator 1 and bridge 11] producing a voltage signal [at point D] whose magnitude and polarity are determined by the magnitude and sense of the departure in speed of the member from a given speed,

an electrically controlled speed adjusting device [fuel valve 66] for the member responsive to said signal for altering the speed of the member in such sense as to reduce the signal to zero,

means [including resistor 98 and bridge 97] providing a second signal variable in accordance with the temperature of the member, said signal having a zero value at a preselected maximum temperature level and

circuit means [including rectifier 113], applying said second signal to said speed adjusting device when it is of polarity resulting from temperature above preselected maximum temperature level, and blocking said second signal when of reverse polarity, said second signal when applied having a polarity such as to effect a reduction in speed of the member.

7. The invention described in the '908 patent is an improvement on the control system of the '809 patent. The '908 invention, like the '809 invention, comprises three interrelated

electrical circuits for controlling fuel flow to the combustion chamber of a gas turbine engine: (a) a "speed control" circuit, (b) an "acceleration control" circuit, and (c) a "temperature override" circuit. The speed control circuit and the temperature override circuit, for purposes here material, are substantially the same as corresponding circuits of the '809 patent, described in findings 5(a) and 5(b), respectively. The principal difference between the systems described in the '908 and '809 patents is the acceleration control circuit, described below.

(a) *Acceleration control circuit*—The function of the acceleration control circuit is to regulate fuel flow to the engine's combustion chamber during acceleration of the engine from idling speed up to a desired operating speed. The patent specification states—

> This invention relates to control systems for engines as disclosed in my * * * ['809 patent] and in particular to an improved arrangement for *controlling acceleration of an engine from an idling to a selected running speed in a manner consistent with maximum safe limits of engine parameters such as engine temperature* and thereafter maintaining the engine at the selected running speed. [Emphasis supplied.] * * *

In short, engine acceleration is controlled as a function of exhaust gas temperature modified by the temperature of air entering the compressor (*i.e.*, atmospheric air). Exhaust gas temperature is used as the parameter on which to control acceleration for reasons stated in the patent specification thus:

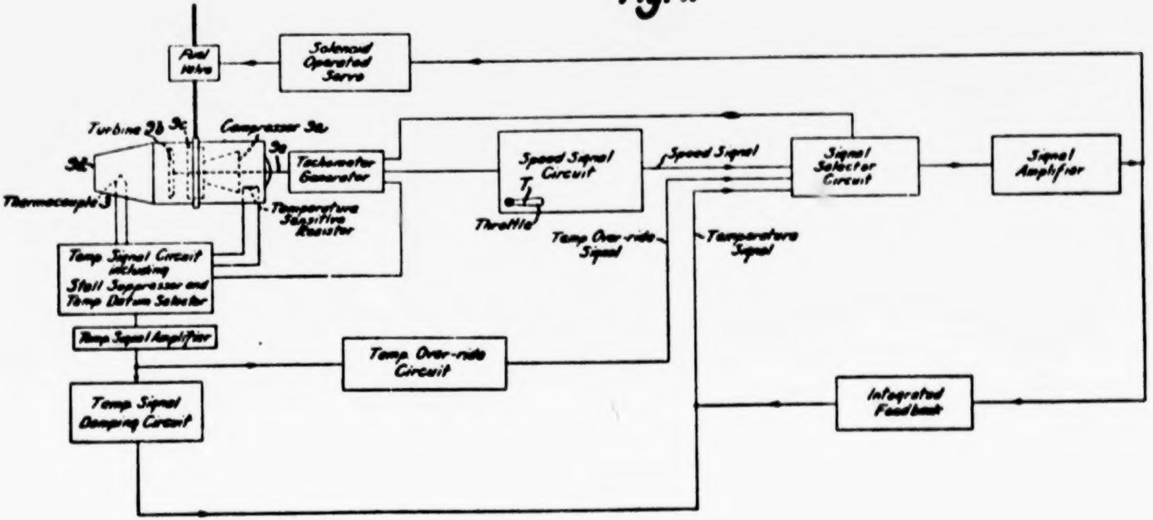
> Another object [of the invention] is to provide an electronic speed control for turbo-jet engines which permits the engine to be accelerated for any speed *at a temperature close to but not exceeding a predetermined maximum allowable safe temperature in the tail pipe.* With present turbo-jet engines, this maximum temperature limit is about 1,500° F. *While it is not permissible to exceed the temperature limit neither is it desirable to accelerate at a lower temperature since this makes the engine acceleration time factor undesirably long.* The latter factor is extremely important for Naval aircraft operating from carriers since a quickly responsive governor is mandatory under certain flight maneuvers such as carrier wave-off. Assuming a plane coming in for a landing on the carrier deck with fully retarded

> throttle is, in the opinion of the landing officer flying at an altitude or speed unsafe for landing and the wave-off signal is given, it is essential that full engine power be available with the least possible time delay in the speed control system. The present system is admirably suited to such an eventuality and tests have shown that if the throttle lever is suddenly advanced after having been fully retarded and the engine is decelerating at its maximum rate, the fuel flow will increase to the maximum allowable value within one-half second after the throttle advance. [Emphasis supplied.]

The temperature of air at the compressor inlet is used for control purposes to modify exhaust gas temperature for reasons stated in the patent specification thus:

> Another object [of the invention] is to provide a speed control system for turbo-jet engines in which acceleration is in general controlled as a function of engine temperature, *the temperature schedule of the control being automatically adjusted as a function of engine speed and/or air temperature at the compressor inlet to prevent stalling of the compressor blading which in turn leads to undesirable surging in the compressor.*
>
> * * * * *
>
> In the operation of jet engines, particularly at high altitudes, conditions are encountered where the compressor may surge due to stalling of the compressor blading. I have discovered that surges may be effectively prevented by controlling the temperature either at the turbine inlet or in the turbine discharge, i.e. in the tailpipe. *This is so because I have discovered that compressor stall is uniquely determined by inlet temperature, speed, and either turbine inlet or tailpipe temperature. The temperature must be scheduled as a function of the temperature of the air at the inlet to the compressor.* Because the surging tendency is also a function of engine speed, the temperature schedule must also be modified according to the speed of the engine.
>
> * * * * *
>
> The required scheduling of temperature to prevent surging in the compressor is accomplished by *superimposing an additional control factor* [*i.e.*, compressor inlet temperature] *upon the temperature circuit since the output signal from the temperature sensing unit used primarily for controlling acceleration of the engine* [*i.e.*, exhaust gas temperature] *can easily be modified to incorporate this additional scheduling factor.* [Emphasis supplied.]

Fig. 1.


Fuel Valve
Solenoid Operated Servo
Turbine 3b
3c
Compressor 3a
3a
3d
Thermocouple 3
Tachometer Generator
Temperature Sensitive Resistor
Temp Signal Circuit including Stall Suppressor and Temp Datum Selector
Temp Signal Amplifier
Temp Signal Damping Circuit
Temp Over-ride Circuit
Speed Signal Circuit
T
Throttle
Speed Signal
Temp Over-ride Signal
Temperature Signal
Signal Selector Circuit
Signal Amplifier
Integrated Feedback

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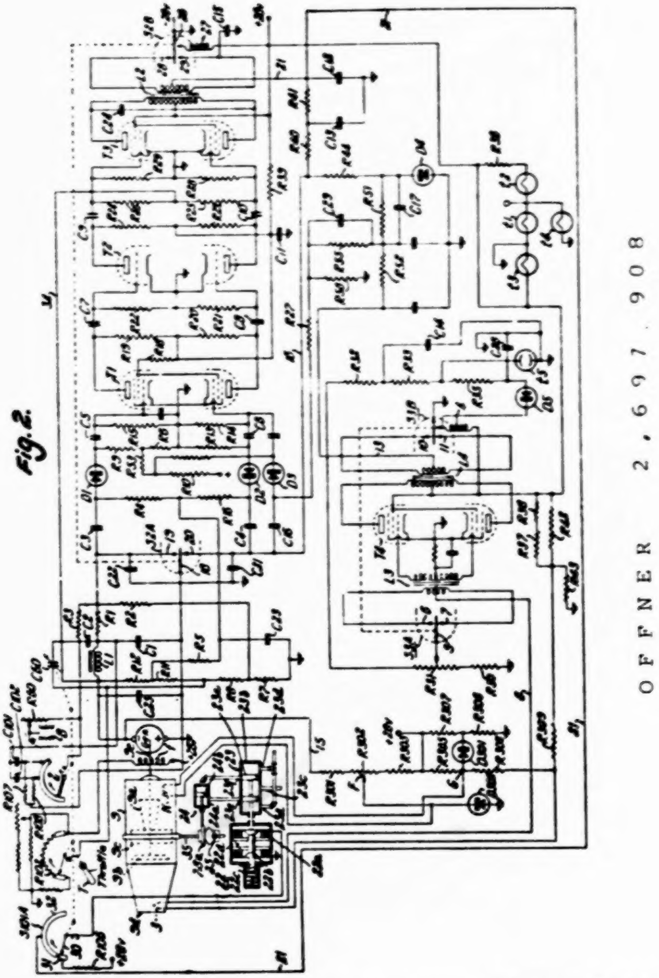


Fig. 2

The acceleration control circuit is best understood with reference to patent Figs. 1, 2, 3, and 8, reproduced herein. Fig. 1 shows in schematic block-diagram form the components of the control system. Fig. 2 shows a detailed circuit diagram of the system. Figs. 3 and 8 are discussed later. A turbojet engine 9 comprises a compressor 9a, a turbine 9b, a combustion chamber 9c, and a tailpipe 9d. Fuel is injected

Fig. 3.

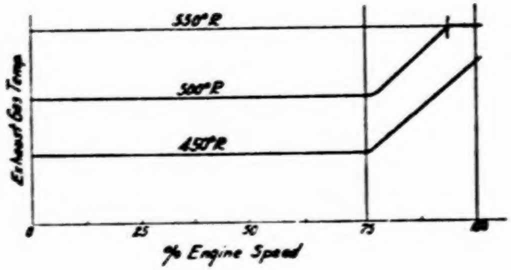
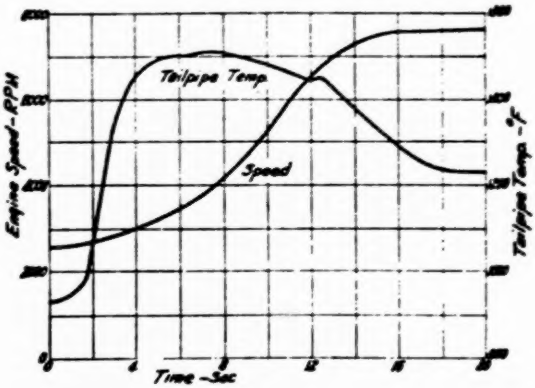


Fig. 8.



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into the combustion chamber 9c by means of a solenoid-operated fuel valve (illustrated schematically in Fig. 1 by blocks marked "Fuel Valve" and "Solenoid Operated Servo"). The solenoid opens or closes the fuel valve in response to electrical signals generated by the control circuits. At or near flying (or running) speeds, the fuel valve is controlled by a null-balance speed control circuit comprising the "Tachometer Generator" and "Speed Signal Circuit" which operate substantially as described in finding 5(a) with respect to the '809 patent. During acceleration from idling speed up to flying (or running) speed, the fuel valve is controlled by a signal which is generated by the "Temperature Signal Circuit including Stall Suppressor and Temperature Datum Selector." Thermocouple 3 in the tailpipe of engine 9 provides a voltage signal representative of exhaust gas temperature. Such signal is modified by a voltage signal from a "Temperature Sensitive Resistor," located just ahead of the compressor (resistor K in Fig. 2) to sense air inlet temperature. The resultant signal is amplified and damped (by the "Temperature Signal Amplifier" and the "Temperature Signal Damping Circuit," respectively) and fed to the "Solenoid Operated Servo." The "Signal Selector Circuit" is designed to pass to the "Solenoid Operated Servo" either the "Temperature Signal" (during acceleration of the engine) or the "Speed Signal" (at engine speeds at or near running speed). In the event the exhaust gas temperature exceeds a preselected maximum, the signal from the "Temperature Override Circuit" is selected by the "Signal Selector Circuit" and is fed to the "Solenoid Operated Servo" which, in turn, operates to reduce fuel flow, thereby to reduce exhaust gas temperature down to the permissible maximum.

The function and operation of the "Temperature Signal Circuit including Stall Suppressor and Temperature Datum Selector" is best described with reference to patent Figs. 2 and 3 and the patent specification thus:

* * * * *

> In Fig. 3, I have shown a series of typical curves with maximum allowable tailpipe temperature plotted against engine speed for several different temperatures of air at the compressor inlet.
>
> At an air inlet temperature of 550° Rankine, it will be observed that the maximum allowable tail pipe gas temperature curve runs parallel with the abscissa which is to say that at all engine speeds, the allowable exhaust gas temperature is limited only by the temperature limitation of the engine, and maximum exhaust gas temperature consistent with safety limits of the engine may be employed.
>
> At 500° Rankine, it will be observed that a lower exhaust gas temperature must be maintained up to the 75% of maximum speed mark if compressor stalling is to be prevented, but that above such speed, higher exhaust gas temperature is allowable until finally when the 90% speed mark is reached the allowable engine tem-

perature is no longer limited by the compressor surge factor but again by the physical temperature limitations of the engine itself. Thus from the 90% speed mark to maximum (100%) engine speed, the 500° curve coincides with the 550° curve.

At 450° Rankine, still lower exhaust gas temperatures must be observed if stalling in the compressor is to be prevented. Examination of the 450° curve will show that while increasing temperatures are allowable at engine speeds above the 75% speed mark, the maximum allowable at maximum engine speed is well below the maximum temperature limitation of the engine as represented by the 550° curve.

*   *   *   *   *

(b) *Overall operation of the system*—The operation of the system as a whole is best understood with reference to patent **Figs.** 1, 2 and 8. The patent specification states as follows:

> While the operating principles of the control system have already been discussed in part in connection with the description of its component parts, a review here of the entire sequence of events which take place when the pilot of a jet propelled plane wishes to accelerate the jet engine, with reference to the speed and temperature curves shown in Fig. 8 that are typical of the results produced, will be conducive to a complete understanding of the invention.
>
> Referring now to Fig. 8, with the engine 9 running at an idling speed of 2700 R.P.M., the output of the cross-over bridge in the selector circuit will be negative and hence the speed of the engine is regulated in accordance with the output signal of the speed circuit applied through rectifier switch D1 and the main amplifier to the control winding 22a of the proportional solenoid 22. The speed signal will of course be zero if the engine speed agrees with the selected speed setting on potentiometer R102; if the two are in disagreement, a signal of the proper polarity to supply the necessary correction to the fuel valve 25 will be generated in the speed circuit and put through the amplifier to the fuel control solenoid 22.
>
> With the engine running at 2700 R.P.M., the temperature in the tailpipe will normally be quite low as compared to the selected maximum level set on the temperature datum potentiometer R31. Thus, for example, if a datum level of 1500° F. is selected, the tailpipe temperature may be of the order of 930° F.
>
> Now assume that the pilot desires to increase the engine speed up to a running speed of about 7800 R.P.M.

The throttle T is pushed forward and the corresponding change in the potential taken off potentiometer R102 immediately swings the output of the crossover bridge from negative to positive thus cutting off the speed signal transmission at rectifier D1 and putting the rectifier D2 into condition for passing control signals from the temperature circuit.

With the tail pipe temperature down about 570° F. below the selected datum level, the initial signal output from the temperature circuit amplifier will be strongly positive and therefore result in an initially high rate of increase of fuel through valve 25 with an attendant steep rise in the tail pipe temperature and the latter soon approaches the datum level thus lowering the temperature signal. However, as the engine continues to pick up speed, the resulting increase in the exhaust gas velocity tends to cool off the tail-pipe somewhat so that the temperature signal is maintained. That is to say, the tail pipe temperature will normally remain below the selected datum level and the fuel rate will continue to increase although at a reduced rate.

When the engine speed reaches the point where the output of the cross-over bridge in the selector circuit swings back to a negative value, signal transmission through the switching rectifier D2 associated with the temperature signal circuit becomes blocked and rectifier D1 unblocks so that the signal produced by the speed circuit is then put through to the solenoid 22 and controls the remainder of the engine acceleration until the selected speed is reached. As the engine speed approaches the selected speed, the speed signal gradually decreases to zero and the speed circuit thereafter continues to exercise control over the engine speed to maintain the latter substantially constant.

The tail pipe temperature lowers with increased engine speed and will stabilize well below the datum level after a fairly high speed is reached. In the curves of Fig. 8, it will be observed that the tail pipe temperature stabilized at about 1300° F. when the selected speed of 7800 R.P.M. was reached.

8. Claims 11 and 35 are set out below in outline form for ease of understanding and with bracketed inserts to tie the claim language to the structure of Fig. 1 [unless otherwise indicated].

11. In a device for controlling acceleration of a combustion gas turbine engine [9] of the type including coupled turbine [9b] and compressor [9a] units

and a combustion chamber [9c] therebetween, the combination comprising,

means [including thermocouple 3] producing a signal voltage variable with the temperature of of the combustion gases,

signal modifying means including a temperature sensing device [resistor K, Fig. 2] responsive to air temperature at the air inlet to said compressor unit for effecting an apparent increase in said signal voltage upon a decrease in compressor air inlet temperature,

means [including resistors R30 and R31] establishing a constant reference voltage the magnitude of which is representative of a selected maximum permissible combustion gas temperature,

circuit means [including vibrating switch S3A] comparing said voltages and which produces a control voltage variable as their difference, and

means responsive to said control voltage [including solenoid 22, hydraulic servo 23, 24 and fuel valve 25] for scheduling fuel admission to said combustion chamber unit in accordance with the amplitude of said control voltage.

35. A device for controlling acceleration from idling speed of a combustion gas turbine engine [9] of the type including coupled turbine [9b] and compressor [9a] units and a combustion chamber [9c] therebetween, the combination comprising,

means [including thermocouple 3] producing a control signal variable with the temperature of the combustion gases,

means [including resistor K, Fig. 2] responsive to the temperature of the air which flows through the engine for varying said control signal inversely as the change in said air temperature, and

means [including solenoid 22, hydraulic servo 23, 24 and fuel valve 25] responsive to said control signal for scheduling admission of fuel to said combustion chamber in an amount variable inversely as the amplitude of said control signal.

9. In 1943, Offner first became aware of the potential need for fuel controls for military gas turbine engines. Dr. William Bollay, then an officer on active duty with the U.S. Navy, advised Offner that the Navy was developing a gas turbine engine for use in jet aircraft and that Offner might be of assistance in developing a control for the engine.

10. Based on theoretical considerations and having not seen a jet aircraft engine, Offner in 1944 built and tested a mockup in simulation of a jet engine and fuel control. The mockup consisted of a turbine driven by compressed air (simulating a jet engine), a motor-driven valve for controlling airflow to the turbine, and an electric generator driven by the turbine for producing an output voltage representative of turbine speed. The output voltage of the generator was compared to a reference voltage, representative of a desired speed; and the difference between the two voltages was used to control relays which operated the motor to move the airflow valve to a more-open or more-closed position, depending upon the polarity of the difference between the compared voltage signals. In this way, turbine speed was changed until the voltage difference became zero. This was, in essence, a null-balance speed control system. The electronic circuit of the speed control system, as embodied in the mockup, was recorded in Offner's laboratory notebook dated June 20, 1944.

11. Soon after June 20, 1944, Offner took the mockup to the Philadelphia branch plant of Westinghouse Electric Corporation and demonstrated it to Mr. Kroon, the chief engineer in the gas turbine division. Shortly thereafter, Offner made an improvement in the mockup speed control circuit by employing a simulated temperature override circuit. Engine temperature was simulated by a variable resistor. No device to sense actual temperature was used. The purpose of the temperature override circuit was to effect a reduction in fuel flow whenever simulated engine temperature exceeded a preselected maximum value. At simulated engine temperatures below the preselected maximum, the circuit had no effect on fuel flow. A diagram showing the temperature override circuit was recorded in Offner's laboratory notebook dated July 25, 1944. The temperature override circuit comprised an electrical bridge circuit which produced an output voltage equal to the difference between the values of two bridge resistors, representative respectively of simulated actual temperature and simulated preselected maximum temperature. The polarity of the bridge circuit output voltage was dependent upon the sense of such difference. The output voltage was applied to a diode which passed the voltage only if the polarity was in the sense indicative of a simulated overtemperature condition; and the output from the diode was connected to the speed control circuit so as to have the same effect on that circuit as an overspeed signal.

12. In the fall of 1944, Offner constructed and tested another model (the "second model") of his jet engine simulator incorporating a null-balance speed control circuit modified by a temperature override circuit. In the second model, the jet engine was simulated by an electric motor driving a flywheel to establish a simulated time constant. The control (designated by Offner as "type 630") consisted of (a) a tachometer generator driven from the motor, (b) a rheostat for regulating the motor speed up or down, and (c) a variable resistor, simulating a temperature sensor in the tailpipe of a jet engine. The second model incorporated circuitry disclosed in Offner's notebook entries of June 20 and July 25, 1944 (noted in findings 10 and 11). On November 10, 1944, Offner wrote to Mr. Kroon at Westinghouse advising him that the second model was ready for demonstration.

13. (a) In early 1945, Offner visited the Air Technical Service Command (ATSC), U.S. Army Air Force at Wright Field, Dayton, Ohio. Offner there met Lt. J. E. Taylor, who was stationed at the engine laboratory, and discussed the proposed fuel control system with Taylor. Taylor, interested in the system, invited Offner to submit a proposal for making, under Government contract, an electronic fuel control for jet engines.

(b) On March 14, 1945, Offner submitted to ATSC a proposal for the "development of an electronic control for jet-propelled aircraft." The proposal was to furnish four units at a price of $10,000, one unit to be a "pilot unit, incorporating variable controls for all necessary factors, in order to determine optimum values," the other three units to be "suitable for installation in aircraft and flight test." Also, it was proposed to submit engineering reports after testing of the units. The proposal further stated:

> The estimated cost * * * [*i.e.*, $10,000] includes the development of the complete electronic equipment, as well as mechanical and rotating electrical equipment suitable for use on tests. * * *

(c) On March 28, 1945, Offner followed up his March 14 proposal with a letter to ATSC advising that further improvements had been made in the electronic fuel control system and that he (Offner) would make a completely new model prior to a demonstration at Wright Field. Attached to Offner's letter of March 28, 1945, was a diagram of the improved circuit, dated March 12, 1945. The circuit included input terminals for the output from the tachometer generator on the engine, a speed reference potentiometer, a circuit comparing the actual speed and reference voltages and producing their difference to establish the speed error signal for actuating the fuel controls, and a temperature override circuit for reducing fuel flow in the event of an overtemperature condition in the tailpipe. The improved circuit of March 12, 1945, also included additional features designed to make it suitable for flight testing, such as means for changing the fuel control over from automatic to manual in the event of a malfunction, various warning and operational lights, and a power supply particularly adapted for use on the standard 28 volt d.c. electrical power system provided on aircraft engines.

(d) On April 20, 1945, Offner wrote a letter to Lt. Taylor discussing various technical aspects of the new control circuit and enclosing a drawing showing a panel layout for the test unit then being built. The letter noted:

> To indicate the type of unit which we are now building for the preliminary test, we are enclosing a print of the panel layout. We hope to have this unit completed for tests by May first, or perhaps shortly thereafter. It it believed that it would be preferable to submit the amended proposal after these tests are made, and after further discussions concerning the desired features.

The test unit, which was completed in May 1945 and developed entirely at Offner's expense, is still in existence, though somewhat modified during later development, and was introduced as an exhibit at trial.

14. In June 1945, Offner took the test unit to Wright Field for demonstration to ATSC personnel. The unit was installed on a J-33 turbojet engine for testing. Personnel at the engine laboratory present during testing were Lt. Taylor, Rudolph Bodemuller, and one Mr. Wente. Bodemuller was head of the group at ATSC, Wright Field, in charge of automatic controls for engines. Bodemuller was familiar generally with fuel control problems on gas turbine engines, though he was not familiar with details of electronic control circuitry. Using the test unit to control the engine, speed control tests were run. The control functioned as intended, although the response of the control to acceleration was sluggish due to overdamping in the circuits. Overdamping was purposely introduced in the circuit to avoid possible overtemperature conditions in the engine.

After completing the speed control tests, Offner offered to mount a temperature-sensitive resistor in the tailpipe of the engine to test the temperature override circuit of the control unit. Offner had brought with him the necessary equipment for temperature override testing. However, the resistor was not installed in the engine because to do so would have required the drilling of holes in the tailpipe. ATSC personnel would not permit this, in view of the fact that the tailpipe already had installed in it a thermocouple element and such drilling would have resulted in a structural change in the engine. Accordingly, in lieu of actually measuring the temperature of exhaust gases in the tailpipe, Offner used a variable resistor located externally of the engine to simulate temperature variations. Similar to tests used with earlier models, the resistor was manually operated to increase its resistance value, thus simulating an increase in engine exhaust gas temperature. Though the evidence is not entirely clear, it appears that a test using the simulated temperature override circuit was conducted and was successful in overriding the speed control circuit to reduce fuel flow when an overtemperature condition was simulated. However, the evidence does not establish that the test was successful to show that the speed control circuit and the simulated temperature override circuit functioned together as stable and operative circuits under varying conditions of jet engine operation from idling speed up to or near actual flight speed. Nor does the evidence establish with certainty what would have been the results of tests if a temperature sensor had actually been installed in the tailpipe. A fair conclusion to draw from all the evidence is that the tests showed the control to have promise as a workable device under actual operating conditions.

15. (a) Following the test at Wright Field in June 1945, Offner from time to time did further work on the jet engine fuel control system as evidenced by various laboratory notebook entries made by Offner or his employees. During the remainder of 1945, Offner made improvements in the system including, among other things, the principles of "crossover" and "acceleration rate" control. The "acceleration rate" control circuit, similar to the one later disclosed in the '809 patent, was designed to control fuel flow to the engine during acceleration of the engine from idling speed up to a preselected percentage of full speed. The "crossover" circuit, similar to the one later disclosed in the '809 patent, served to transfer control of fuel flow from the "acceleration rate" control circuit to the null-balance speed control circuit when engine speed reached the preselected percentage of full speed.

(b) In early 1946, Offner wrote a report covering the general principles, advantages and possible modes of use of electronic controls for jet engines, including fuel handling and tail-cone positioning for a variable geometry engine. A copy of the report, dated February 25, 1946, was sent to ATSC at Wright Field, along with a cover letter dated March 4, 1946. The cover letter stated in part:

> I am enclosing a copy of a report which I have recently made up on our work on our control for jet engines. We are sending copies of this to Allison, and to Packard. If you think it would be of interest, we will be happy to send copies to any other companies that you might suggest.

* * * * *

By letter of March 20, 1946, ATSC suggested that Offner send copies of the report to various organizations including the Navy's Bureau of Aeronautics, the General Electric Company, Northrop Aircraft Company, Continental Motors Corporation, Harvey Machine Company, and Lockheed Aircraft Corporation. Thereafter, Offner sent copies of the report to such organizations.

16. By letter dated March 7, 1946, ATSC requested Offner Electronics Inc. (Offner's company) to provide quotations on "Offner J-33 fuel control units" to include "full range speed control, acceleration and deceleration control, minimum speed control, temperature control, and complete emergency control." On March 20, 1946, Offner replied by letter giving quotations "for the furnishing of one, two, and three complete Offner J–33 fuel control units * * *." The letter stated:

> * * * Because of the quick delivery you wish, it will not be possible for us to do the complete development of these units as we would wish in order to insure stable control under all conditions. However, we have provided for 20 days laboratory and test-house time, in the proposal, this work to be performed either in our laboratory or at Allison, as may prove most expeditious.
>
> The controls will be suitable for flight testing altho they will not be final flight models. All factors which may require variation will be brought to variable panel controls so that optimum values may be determined either in laboratory or in flight. Barometric control will not be provided. In place of this, the controls will be manually varied to find the optimum setting at various altitudes. In this way, the desired curve for a barometric control may be determined for the final model.
>
> *   *   *   *   *

The proposal quoted the following prices: one unit, $4,500; two units, $6,300; three units, $8,100.

17. (a) On June 20, 1946, a purchase order (Government Contract W33–038 ac 15202) was issued to Offner Electronics Inc. for one J–33 fuel control unit at a price of $7,500. The description of the "ARTICLE" to be furnished under the contract was as follows:

> CONTROL, power, automatic, for J–33 turbo-jet engines, suitable for engine and flight tests, and in accordance with the requirements of Exhibit "A" attached hereto.
>
> *NOTE:* In addition to the above, the Contractor shall furnish the Government a Final Report, in quadruplicate, covering all details of design, development and testing of the above mentioned control.

Exhibit "A", noted above and attached to the contract, reads as follows:

> TENTATIVE SPECIFICATION FOR A J–33 CONTROL
>
> a. Automatic maintenance of a selected engine speed over the speed range 4,000 to 11,500 RPM ±1% at altitudes from sea level to 50,000 feet.

b. Automatic limitation of maximum metal temperature of any critical engine part, e.g., turbine buckets, to within plus or minus fifty degrees Fahrenheit (±50°F.) of such a temperature as may be specified by the engine manufacturer, with particular application during starting, acceleration, and maximum power operation. In addition, adjustment shall be provided which permits selection of the maximum temperature over a range of plus or minus twenty-five percent (±25%) of the present maximum allowable absolute temperature.

c. Adjustment shall be incorporated which will permit selection of the minimum or idle speed of approximately 3000 RPM ± 25.0% at sea level and with rising altitude characteristic as required by the engine.

d. Starting control such that either a fixed fuel pressure with provision for suitable adjustment is supplied for starting lever position or variable pressures are supplied for an adjustable starting lever position.

e. Automatic control of the rate at which the unit can increase the fuel delivery to the engine when the control lever is instantaneously moved to full speed position from the minimum cruising position. Such acceleration rate limitation device shall admit of adjustment to give a greater effect in the lower speed range than in the higher speed range, with easy change of relative influence at high and low speeds and biased with altitude approximately as required by the engine.

f. Operation on kerosene conforming to Specification AN-F-32 and gasoline conforming to AN-F-28 with the further stipulation that components of the unit will not be deteriorated by fuels containing at least 3% by volume of xylidine.

g. Fuel pump of the constant displacement type which shall be incorporated in the control unit in such a manner as to be replaceable on the control assembly (optional; may be separate from pump).

h. Fuel flow from the unit shall be of capacities and delivery pressures in accordance with requirements for the I-40 engine as specified.

i. Weight of this control shall be approximately 20 pounds.

j. Dimensions of the control shall be such that the control shall not extend more than ——— inches from the center of the pad as measured perpendicular to the rotor shaft and more than ——— inches from the pad as measured forward of the pad.

k. Mounting shall be suitable to a pad conforming to Drawing No. AND 10001 or to drawing later approved. The spline shall be undercut to withstand shear of at least four times the operating torque or 1800 pound inches, whichever is least.

l. Idle cut-off shall be included in the control to provide a gradually increasing restriction to positive, seepage-tight cut-off. Operation shall be accomplished through use of a flat zone at the low end of the speed control lever.

m. Speed control lever such that lever travel is proportional in a manner to be specified to engine RPM irrespective of altitude with normal positioning between idle and maximum speed. Travel of the speed control lever shall be a minimum of 90° from adjustable idle speed to adjustable maximum.

n. Emergency fuel manual control shall be provided if possible.

o. Fuel inlet port shall accept a straight threaded, 1¼" O.D. fuel line and fuel outlet shall accept a straight threaded 1" O.D. fuel line. Starting fuel port shall accept a straight threaded 1" O.D. fuel line. The control unit shall also provide an unused connection for a vent return to provide auxiliary scavenging if required.

p. Scavenging if required shall be accomplished internally; however, submerged unit which does not require scavenging will be preferable.

q. Fuel filter will not be furnished under the terms of this contract but the fuel system shall be understood to incorporate a specified fuel filter such that 98% of particles 10 microns or larger are removed.

r. Prior to delivery of any control unit, one each identical unit shall have operated successfully for a minimum of 50 hours under operating conditions of maximum severity, and each control unit delivered shall have been operated successfully for 5 hours over full metering and speed ranges.

s. Fuel lines, cockpit quadrants and linkages will not be furnished by the contractor under the terms of this contract. All electrical components will be furnished by the contractor.

(b) Contract W33-038 ac 15202 contained a "Patent Rights" clause, in part as follows:

> (a) Where used in this Article, and not elsewhere in this contract, the expression "Subject Invention" means each invention, improvement and discovery (whether or not patentable) conceived or first actually reduced to practice (i) in the performance of this contract; including any subcontract hereunder except subcontracts for standard commercial items or subcontracts which do not involve either research or development (including en-

gineering which amounts to either research or development) beyond that normally incident to the performance of a supply contract for the class of item involved, or (ii) in the performance of any research or development work relating to the subject matter hereof which was done upon the understanding that this contract or any subcontract hereunder would be awarded; the expression "Technical Personnel" means each person employed by or working under the direction of Contractor or any subcontractor hereunder who, by reason of the nature of his duties in connection with the performance of this contract, or any subcontract hereunder, would reasonably be expected to make inventions; and the expression "Contractor's Patent Rights" means all patents and applications for patent, under which Contractor now has or may hereafter acquire the right to grant a license, to the extent that they are based upon the disclosure of inventions other than a Subject Invention.

(b) Contractor agrees to and does hereby grant to the Government an irrevocable, non-exclusive, non-transferable and royalty-free license to practice, and cause to be practiced for the Government, throughout the world, each Subject Invention in the manufacture, use and disposition according to law of any article or material, and the use of any method; provided, however, (i) that as respects any Subject Invention made by Technical Personnel employed by or under contract with the Contractor prior to the date of this contract whom Contractor has in good faith endeavored to bring under agreement to pass, or giving Contractor the right to pass, to the Government the rights herein provided, and as respects any subject invention made by others than Technical Personnel, and as respects the practice of any Subject Invention in foreign countries, the said license and other rights hereinafter provided shall be to the extent of Contractor's right to grant the same; (ii) that nothing contained in this sentence shall be deemed to grant a license under Contractor's Patent Rights; and (iii) that with respect to any subcontract hereunder, Contractor's obligations under this article will be discharged upon its including in such subcontract a patent rights article not less favorable to the Government than as herein provided.

* * * * *

18. (a) Sometime prior to November 1946, personnel of Thompson Products, Inc., Cleveland, Ohio (hereafter Thompson Products), visited Offner and became interested in his fuel control project. Thompson Products agreed to

design and build a motorized fuel valve for use with Offner's control system in forthcoming tests, pursuant to Government Contract W33–038 ac 15202. In fact, Thompson Products manufactured such valve and Offner used it, as intended, in later tests of the control system. Sometime after meeting with Thompson Products personnel, but before November 15, 1946, Offner visited the Allison Division of General Motors Corporation, Indianapolis, Indiana (hereafter Allison), to discuss arrangements for testing on a J–33 engine the electronic control then being built by Offner under Contract W33-038 ac 15202. Allison was working with the Government to develop gas turbine engines for use in military aircraft.

(b) Between June and December, 1946, Offner reported periodically to ATSC, by then renamed Air Materiel Command (hereafter AMC), on progress being made in the manufacture of the fuel control unit called for by Contract W33–038 ac 15202. The unit (designated by Offner as "630X5") was completed by the end of December 1946 and was successfully bench-tested (but not flight-tested) in January 1947 on a J–33 turbojet engine at Allison. Offner reported the test to AMC by letter dated January 22, 1947. Among other things, Offner requested information from AMC regarding J–33 engine characteristics so that he could make "stability calculations on the control of the * * * engine."

(c) On February 10, 1947, Offner sent to AMC a report, dated February 5, 1947, covering the tests carried out at Allison during the period January 13–17, 1947. The report was prepared by Offner and James Hansen, Project Engineer for Offner Electronics Inc., and was submitted pursuant to the requirements of Contract W33–038 ac 15202. The report described both the basic theory of the Offner electronic control and the tests conducted at Allison. In describing the tests, the report noted that in early tests, the "time-temperature response of the temperature unit * * * was found to be too slow, so arrangements were made to enlarge the hot gas inlet and outlet holes * * *." In a later test, it was noted that the "time response of the temperature unit resistance element was still too slow, so the mechanical shield was removed. This improved the time response * * *." Test curves included in the report, plotting "time" against engine "speed" and "temperature," show that the temperature override circuit functioned to limit engine exhaust gas temperature to a preselected maximum (about 1,300–1,500° F.). The report concluded that, "No final conclusions can be drawn from the preliminary tests." It also noted as a "tentative" conclusion as follows:

> *b.* A temperature measuring unit placed in the tail pipe appears to have satisfactorily quick response speed, and preliminary tests indicate that it may stand up sufficiently well for practical use. The utilization of the temperature signal must be improved, to obtain stable control. It is believed that increased temperature—speed droop characteristics may provide the necessary stabilization.

(d) The fuel control unit manufactured pursuant to Contract W33-038 ac 15202 and tested at Allison in January 1947 included a null-balance speed control circuit and a temperature override circuit. The test set-up at Allison differed from the test set-up at Wright Field in June 1945 (finding 14) in that the temperature sensor of the temperature override circuit was mounted in the tailpipe of the engine. Also the unit tested at Allison included the following additional improvements: acceleration and crossover circuits; integrated feedback circuit for increasing stability of engine operation at constant speed; amplifying, relay actuating and solenoid circuit; and a temperature derivative means on the temperature override circuit for increased stability.

(e) The control and electrical circuits described in the report of February 10, 1947, formed the basis for the patent application filed by Offner in August 1947, which application matured into the '372 patent, and later the reissue '809 patent, here in suit.

19. (a) The fuel control unit manufactured by Offner pursuant to Contract W33-038 ac 15202 was successfully bench-tested at Wright Field in May 1947 on a J–35 turbojet engine. The J–35 engine has an axial flow compressor as compared to a centrifugal flow compressor on the J–33 engine. A report covering the test in May 1947 was issued by AMC on May 29, 1947. The report noted that tests had been run earlier at Allison (January 1947), and concluded that "the hompson-Offner power control system demonstrated very romising possibilities in control of the J-35-C3 turbo-jet ngine." The report also noted as follows:

> No attempt will be made to analyze the operation of the electronic equipment in this report. This was not felt to be necessary since the test was primarily made to aid the contractor in selection of optimum design for further refinement of this system.

(b) Up through May 1947, no flight tests had been conducted with any Offner electronic control. However, the 630X5 control, tested at Allison in January 1947 and at Wright Field in May 1947, was fully operative for jet engine bench tests; and but for its mechanical form and certain adjustable controls, it was suitable for flight tests.

20. Contract W33-038 ac 15202 was deemed completed in late May 1947, upon delivery by Offner to the Government of the control designated 630X5. On January 13, 1948, AMC requested Offner Electronics Inc. to identify and disclose any inventions made under the contract, pursuant to the requirements of the contract's Patent Rights clause. Irving Hoffman, Vice President of Offner Electronics Inc., responded on February 2, 1948, that "at the time of completion of the subject contract, we had made no inventions nor discoveries; had not filed, nor are we preparing to file any patent applications in connection with this contract."

21. After the tests at Wright Field in May 1947, Offner, in conjunction with Thompson Products (later discussed in detail), continued with development of the fuel control system, particularly on the electronics and component parts design, with a view to engineering a model suitable for flight testing and production. One such model, built in accordance with a circuit diagram designated by Offner as drawing A630X7, was built and bench-tested at Allison in or about November 1947.

22. About the end of 1947, Offner, while working on further development of his electronic fuel control system, considered the problem of jet engine compressor stall or surge. At high altitudes and/or low ambient air temperatures, jet engine compressors tend to stall or surge. Previously known methods for preventing compressor stall and surge required measurement of compressor pressure ratio, or measurement of compressor discharge pressure, fuel flow and air inlet temperature. Since Offner's electronic fuel control, as developed up to the end of 1947, did not require for its operation the measurement of compressor pressure ratio, compressor discharge pressure or fuel flow, Offner came up with the idea of preventing compressor stall and surge by scheduling engine exhaust gas temperature as a function of compressor inlet temperature and engine speed, so to relate exhaust gas temperature to the stall characteristics of the compressor. Offner's conception of a stall suppressor circuit, whereby the voltage signal representative of exhaust gas temperature is modified by a voltage signal representative of compressor inlet temperature, was recorded in Offner's laboratory notebook dated December 29, 1947 and January 5, 1948.

23. In early 1948, Offner built a stall suppressor circuit in accordance with his notebook entries, noted in finding 22. The circuit was tested in conjunction with other control circuits on a simulated jet engine. Values for compressor inlet temperature and exhaust gas temperature were simulated with manually-variable resistors. No temperature sensors were used, and the circuit was not tested on an actual jet engine at that time.

24. (a) Sometime before September 1948, Offner modified his then-existing electronic fuel control to incorporate the stall suppressor circuit. Flight tests were conducted in the summer and fall of 1948 at Muroc Air Base, Muroc, California, with an Air Force B-43 aircraft having two J-35 engines. In September 1948, Offner's fuel control system, including the stall suppressor circuit, was successfully flight-tested.

(b) Offner and Allison personnel submitted various reports of the flight tests conducted during mid-1948, and Offner submitted a summary report on September 24, 1948. The report noted in part as follows:

> * * * Flight Test Request of Thompson-Offner Control was run at M. A. F. B. from 10 September to 15 September, 1948. Tentative data, based mostly on pilot's observations, indicated control performance to be within AN-E-30 in all respects except for intermediate accelerations at 40,000 ft. Full accelerations were satisfactory at

> all altitudes. Consistency of control performance was excellent.
>
> * * * * *
>
> * * * The performance of the control has met expectations during the Test Request flights. The minor deviations from desired performance was [*sic*] due to known factors, which it was not felt worth while to correct in the present tests, in view of the restricted time available.
>
> * * * * *
>
> The satisfactory performance of service test units, made basically according to the present design, but with the minor changes discussed, appears assured.

25. The stall suppressor circuit, as first noted in Offner's laboratory notebook in late 1947-early 1948 and subsequently flight-tested in September 1948, was substantially the same as that disclosed and claimed in the '908 patent, which matured from an application filed by Offner in the U.S. Patent Office on March 31, 1949.

26. By agreement dated March 5, 1947, Offner Electronics Inc. and Thompson Products entered into a patent license contract whereby Offner Electronics Inc. granted to Thompson Products "the exclusive right and license, with the right to grant sublicenses," under a patent application then in preparation "to use, permit the use of, and sell, throughout the United States of America * * * the fuel systems of Turbo-Jet type of engines, Electronic Signal Generators embodying the inventions * * * set forth in the claims of the application for United States Letters Patent hereinbefore identified * * * together with all improvements thereon and betterments thereof." The patent application, above noted. was filed in August 1947 and matured into the '372 patent, which later, by reissue, became the '809 patent. Offner Electronics Inc. further agreed to "use its best efforts" to supply Thompson Products with Electronic Signal Generators referred to above; however, Thompson Products was granted the "right and license to manufacture, or to have manufactured by others for it, said Electronic Signal Generators, but only to the extent that OFFNER is unable or unwilling to supply the same * * *."

The inventions defined by the claims of the '908 patent, the application for which was filed on March 31, 1949, were "improvements" and "betterments" of the inventions of the '809 patent. The '908 patent therefore came within the express language of the license agreement and Thompson Products was licensed thereunder.

27. On or about March 25, 1947, Thompson Products prepared and submitted to Allison a proposal to supply "five Thompson Offner electronic governors and associated fuel system components suitable for use in aircraft turbo jet engines." A report, dated March 25, 1947, stated as follows:

> Thompson Products, Inc. of Cleveland and Offner Electronics Company of Chicago have jointly developed a governor-fuel system combination for controlling aircraft turbo jet engines.
>
> Thompson Products will supply the complete Thompson-Offner fuel system to the industry.
>
> Drawing D175–424 shows the proposed system. Offner Electronics Company have developed the electronic control components consisting of a speed sensing unit, a temperature sensing unit, proportional solenoid and the integrating electronic circuits contained in a control box. Thompson Products have developed the fuel system components consisting of a compensated relief valve, pilot valve, and the main throttle valve which is controlled by the pilot valve.
>
> The system shown on drawing D175–424 incorporates the improvements indicated as a result of tests run on a J–33 turbo jet engine at Allison Engineering Division at Speedway City January 13–17, 1947. These tests are described in Offner Electronics, Inc. report entitled "Automatic Power Control for J–33 Turbo-Jet Engine" dated February 5, 1947. This is a "Preliminary Report—Contract Number W33–038 ac 15202." Copies of this report were sent to Allison Engineering Division and Wright Field.
>
> * * * On March 21, 1947 there was a meeting held in Mr. R. Bodemuller's office, Power Plant Laboratory, Wright Field. The meeting was attended by—
>
> J. Schmid—Allison Engineering Division
> F. Offner—Offner Electronics, Inc.
> T. R. Thoren—Thompson Products, Inc.
> L. L. Aspelin—Thompson Products, Inc.
>
> The purpose of the meeting was to discuss a program for building a service test quantity of five (5) fuel systems in accordance with drawing D175–424.
>
> Mr. Bodemuller requested that the Allison Engineering Division submit to Wright Field by April 1, 1947 a proposal to furnish a service test quantity of five (5)

> Thompson-Offner electronically controlled fuel systems for turbo-jet engines. The disposition of these five (5) systems would be as follows:
>
> One (1) each to Thompson, Offner, and Allison. The remaining two to be sent to Muroc, one for flight testing and one to be held as a spare.
>
> Mr. Bodemuller indicated that it would be Allison's responsibility to furnish an acceptable fuel system and that therefore Allison's desires should be reflected in the design details of the Thompson-Offner apparatus.
>
> Mr. Bodemuller indicated further that sufficient engine test stand running should be conducted at Allison prior to the Muroc flight tests to prove the performance and reliability of the system.
>
> It was indicated that procurement by Wright Field would be initiated July 1, 1947 which is the beginning of the new fiscal year.

The report listed the various fuel control components to be furnished Allison by Thompson Products. The components included: "Offner Electronic Governor, Offner Governor Generator, and Offner Temperature Unit."

The proposal of March 25, 1947, was revised on August 11, 1947, to include the selling price of the fuel control system. The total price was $48,900 for two units, and $5,200 for each additional unit "in quantities of 4 or 5."

28. On April 7, 1947, Allison submitted to AMC, Wright Field, a proposal for "* * * Procurement and Testing of Five (5) Thompson-Offner Turbo-Jet Engine Controls." The "total contract amount" was $105,100. The Government was to furnish two J–35 engines for bench testing. No flight testing was included in the proposal. The proposal further stated as follows:

> This proposal is submitted on the basis that the clauses pertaining to patents, licenses, rights, etc., used in present contracts with our company will be included in the definitive contract for the above items.
>
> * * * * *
>
> In submitting the above proposal it should be recognized that this is a joint research and development program on new type controls involving the Government, control manufacturers, and this contractor; which no doubt will incur numerous changes in design which we will have to negotiate from time to time.
>
> * * * * *

29. A memorandum dated July 9, 1947, and captioned "Thompson-Offner Turbo-Jet Engine Controls", was sent to Allison by Col. R. J. O'Keefe, Acting Chief, Power Plant Laboratory, Engineering Division, Wright Field. The memorandum stated in part:

> 1. Enclosed herewith are copies of photographs taken of an advance mockup installation on a Model J35-0-3 engine of the proposed subject engine controls. The photographs were taken during a conference at the Air Materiel Command 25 June 1947. Attending were Mr. F. F. Offner of Offner Electronics, Inc. and Mr. T. C. Noon of Thompson Products, Inc. Other items considered in this conference were a detailed discussion of the Offner electronic component of the power control and items in connection with a former similar contract between the Air Materiel Command and Offner Electronics, Inc.
>
> * * * * *
>
> 3. Thompson Products, Inc. and Offner Electronics, Inc. have been requested henceforth to coordinate all further work through you as it is considered that the work currently being accomplished is directly applicable to the contract being negotiated on your proposal dated 7 April 1947 to supply five control units to the Air Materiel Command. It is believed advisable that the mockup be duplicated by you when contract arrangements are completed and the engine model is established in order that such items as the final arrangement of the control envelope may be established and provisions made for the necessary electrical wiring.

30. On September 12, 1947, Allison submitted to AMC, Wright Field, a revised proposal for "Furnishing and Testing of Electronic Controls of J35 Engines." The revised proposal resulted from conferences held on July 29, 1947, between Allison and AMC personnel. Under the revised proposal, Allison was to furnish two different controls for evaluation and testing: the Thompson-Offner control and a competing control under development called the Eclipse-Pioneer control. The proposal called for bench and flight tests of the controls, and for reports covering all phases of the tests. The proposal stated in part:

> 1. The above proposal is contingent on the fact that the Government will furnish the engines and engine parts specified in our letters of quotation dated April 7, 1947 and April 10, 1947.
>
> * * * * *

> 4. In order to expedite this program, it is understood that the Government shall accept all costs incurred by us prior to the date of a firm contract.
> 5. It is understood that the license and patent rights article as outlined in reference (a) and (b) letters shall apply.

The "reference (a) and (b) letters," noted in item 5 above, were AMC "Requests for Quotation" to Allison, dated July 7, 1947.

31. On December 1, 1947, T. Cyril Noon, Project Engineer for Thompson Products, wrote to D. W. Cripe of Allison, in part as follows:

> In one of our discussions while at your plant recently, you expressed a desire for a letter with answers to two questions you had previously mailed to us.
>
> * * * * *
>
> With reference to your letter of October 27, 1947:
>
> The "previous contract" you mention is, I think, the contract between AMC and Offner Electronics, Inc., which called for the delivery of one electronic jet engine control. Thompson Products was only an interested bystander in this work as we had only recently become connected with Dr. Offner in the control work. We furnished the motor driven fuel valve for the control as a subcontractor to Offner. The last test run using that control was run at your plant in January, 1947.
>
> Immediately after those tests, work on the present control began which has resulted in the present configuration of the Thompson-Offner electronic jet engine control. Design and test work was done before the Wright Field test in May, 1947 and redesign and test work was done after those tests. We are willing to submit reports of the work done during the present control development period as required to fulfill the presently forthcoming contract covering that development.

32. On December 9, 1947, T. R. Thoren, Director of Develment for Thompson Products, wrote to F. F. Offner as follows:

> Confirming our discussion, please proceed to bill us monthly for the work you do on the jet engine control for Allison. The first billing to be for the month of December, 1947. I suggest that you make out one or more project assignment sheets to cover specific phases of your work. I am enclosing several blank vellum forms which I suggest you use if they fit your record system.

> I suggest that billings be broken down to show
> - a. Cost to salaries
> - b. Cost to shop work
> - c. Materials
> - d. Burden
>
> All invoices to show the project number.
>
> Further, I would like to have from you a breakdown as above by months, if possible, covering the work you have done on the Allison project to date. My thought is that you may wish to bill us this year for the work and that amount would be deducted from the amount due you when you receive payment from Allison.

33. On December 10, 1947, T. R. Thoren of Thompson Products prepared a memorandum to A. T. Colwell, Vice President of Thompson Products, stating in part as follows:

> I wish to review with you certain phases of our development program and get your approval of my plans. These plans require the addition of more personnel and the expenditure of substantial funds for facilities.
>
> I wish to limit this meeting to our jet engine fuel system projects. This letter covers the most important details.
>
> 1. *Offner contract.*
>
> a. As you know, Offner has been financing his own work to date which was his idea when our contract was drawn up. This has become a burden to him which I know he is unable to carry further without our assistance.
>
> I have written him requesting that, beginning December 1, he set up projects using our record forms and bill us monthly for the work he does.
>
> I have also requested that he send me a cost breakdown by months covering his work done to date on the Allison control. I would like your approval to pay him this year for the work he has done in 1947.
>
> b. Thompson's proposal to Allison for the development of an electronic control for their TG–180 totals \$54,100.00. Offner has raised the question as to what percentage of this will be paid to Offner Products. I believe this question should be decided now and Offner advised. I have asked Offner for his ideas and after considerable discussion, he stated that he thought a division of 45% to his company and 55% to Thompson should be considered. It seems to me that some such division is proper in view of the fact that the basic electronic circuit is his and our forthcoming contract with Allison would not have been possible except for Wright Field's previous interest in Offner's work. Offner is agreeable that progress billings to us be deducted from the amount due him under the above recommended percentage. It

seems to me that by the time we complete the flight tests at Muroc the 45% will be completely covered by Offner's expenses.

* * * * *

To summarize, will you approve the following.

I. Payment to Offner this year to cover the work he has done on the Allison control during 1947?

II. Monthly progress billings from Offner until completion of the Allison contract.

III. Payment to Offner of 45% of the receipts from Allison less his progress billings up to date of completion of the Allison contract.

34. By invoice dated December 23, 1947, Offner Products Corporation (formerly Offner Electronics Inc.) billed Thompson Products the sum of $26,937.95. The invoice stated:

> Interim billing for work done on Electronic Jet Control from January 1, 1947 to December 17, 1947 in accordance with attached break-down.

The attached breakdown identified the specific items of cost as follows:

Total Labor	$12, 589. 50
Overhead	13, 848. 45
Materials	500. 00
Total Cost of Production and Development	$26, 937. 95

The "Total Labor" figure included 75 days of Franklin F. Offner engineering time at $120 per day. The breakdown concluded with the note, "No profit is included in this statement."

35. On January 30, 1948, Allison shipped to Muroc Air Base, Muroc, California, one Thompson-Offner control for flight testing. Shipment was made prior to completion of contract negotiations between AMC and Allison in order to expedite the development and flight-test program on the Thompson-Offner control. Personnel of Thompson Products were sent to Muroc to install the hydraulic portion of the control. James Hansen, of Offner Electronics Inc., went to Muroc during installation of the control and remained there during initial flight testing.

36. By letter dated February 3, 1948, R. C. Golt, Contract Administrator for Allison, wrote to AMC, Wright Field, in part as follows:

> 1. The attached Patent Rights Article is the latest clause that has been agreed to between the Government

> and G.M., and we feel that it should be included in the definitive contract. This was outlined in Section 5 under Terms and Conditions of our January 9th proposal.
>
> * * * * *
>
> 3. It is also understood that we are bidding on two controls, one to be manufactured by Thompson-Offner and another by Eclipse-Pioneer. It is our plan to evaluate these two controls after the necessary testing has been completed and that whichever one proves most satisfactory and is approved by the Government and ourselves for use in production will be purchased from the original designer.

The proposed Patent Rights Article above mentioned is identical to Article 41 of Contract W33–038 ac–20375, later entered into by the Government and Allison. (Finding 38).

37. On March 8, 1948, Maj. S. C. Pace, USAF, Chief, Power Plant Branch, Aeronautical Equipment Section, Procurement Division, AMC, Wright Field, prepared an interoffice memorandum for AMC entitled "Request for Approval of Contract W33–038 ac–20375—Allison Division, GMC." The memorandum stated in part:

> 1. Name and address of contractor: Allison Division General Motors Corporation, Indianapolis 6, Indiana.
>
> 2. Work under this contract will be performed at contractor's plant, Indianapolis 6, Indiana with the exception of subcontracting which is approximately 70% or $124,445.00.
>
> 3. The following services and supplies will be furnished:
>
> Item 1—(3) Reports, covering bench tests of a Thompson-Offner turbo-jet engine power control and a study establishing the redesigned criteria for the control procured under Item 3 _______________ $20,524.00
>
> * * * * *
>
> Item 3—One Electronic Power Control, Thompson-Offner type, suitable for flight _____________ 25,068.00
>
> * * * * *
>
> Item 5—(3) Reports, covering engine and bench tests conducted on Government-furnished Thompson-Offner power control from Item 3 above. These bench tests will be conducted for the purpose of checking the general requirements of ANA Specification and electronic apparatus requirements and preparation of the control for subsequent flight operation on a J35 turbo-jet engine _________________________________ 25,068.00
>
> * * * * *

> Item 7—(3) Reports, covering the results of Government-conducted flight tests of approximately ten (10) hours duration using the Thompson-Offner power control of Item 3. Allison will furnish one engineer to AMC following completion of tests required under Item 5, for the purpose of guiding the flight test program and compilation of report.......................... 2,852.00
>
> * * * * *
>
> 8. In using Fixed Price Form No. 32, the following special provisions are incorporated in this contract:
>
> * * * * *
>
> Deviation (Article 39, para. (g))—All cost incurred by contractor prior to receipt of contract is to be considered allowable items of cost. * * * (From 1 July 1947 to date of approved contract.)
>
> * * * * *
>
> 13. Subcontracting in connection with this procurement is approximately 70% or $124,445.00.
>
> * * * * *

38. On March 15, 1948, the Department of the Air Force and Allison entered into Contract W33-038 ac-20375 for "Electronic Power Controls, Tests, Reports and Data" in the amount of $213,335. The contract provided for procuring, testing (both bench tests and flight tests), and evaluating the Thompson-Offner control and the Eclipse-Pioneer control and rendering reports thereon. Article 39 of the contract, entitled "Retroactive Price Revision", provided as follows:

> (a) Because of the experimental and developmental nature of the work called for by this contract and the great uncertainty as to the cost of performance hereunder, the parties agree that the contract price fixed in Article 15 hereof may be increased or decreased in accordance with the provisions of this Article.
>
> * * * * *
>
> (g) For the purposes of the price revision under this Article, all costs which have been incurred by the Contractor in anticipation of this contract on and after 1 July 1947, and prior to the signing thereof, and which would have been considered as allowable items of cost under this Article shall be allowable items of cost hereunder.

Article 37 of the contract, entitled "Subcontracting," provided in part:

* * * * *

> (e) For the purposes of this Article the term "subcontracts" includes only contracts for the production of or work upon an item, component, or assembly manufactured according to Government specifications or specifications of a prime contractor and does not include (1) any purchase of a standard commercial or catalog item, or (2) any purchase of a basic raw material, or (3) any purchase of supplies or services for the general operation of the Contractor's plant, or (4) any purchase from a parent, subsidiary or affiliate of the Contractor.

Article 41 of the contract, entitled "Patent Rights", comprised four subparagraphs, (a) through (d). Subparagraph (a) is identical to the like-identified subparagraph in Contract W33–038 ac 15202, set out in finding 17(b). Paragraphs (b) through (d) are set out below:

> (b) Contractor agrees insofar as it has or may acquire the right to do so without incurring any obligation to pay royalty or other compensation to others solely on account of said grant, to grant and does hereby grant to the Government an irrevocable, non-exclusive, non-transferable and royalty-free license to practice, and cause to be practiced for the Government, throughout the world, each Subject Invention in the manufacture, use and disposition according to law of any article or material, and the use of any method; provided, however, (i) that nothing contained in this sentence shall be deemed to grant or imply a license under Contractor's patent rights; and (ii) that with respect to any subcontract hereunder, which subcontract involves either research or development (including engineering which amounts to either research or development) beyond that normally incident to the performance of a supply contract for the class of item involved, Contractor shall exert his best efforts to negotiate for the inclusion in the subcontract involved of a patent rights section not less favorable to the Government than as herein provided and in the event of refusal by a subcontractor, Contractor shall procure the approval in writing, of the Contracting Officer or his designee before proceeding with the subcontract and shall cooperate with the Government in the negotiation with such subcontractor of an acceptable patent rights article, provided, however, that notwithstanding any of the foregoing provisions of this subsection Contractor shall in any event require any subcontractor hereunder to grant to the Government, to the extent above agreed to be granted by the Contractor patent rights of the same scope and on at least as favorable conditions as are

granted to Contractor by such subcontractor under the terms of such subcontract and as a part of such subcontracting transaction. The enforcement of the obligations of any subcontractor hereunder regarding "Subject Inventions" shall be the right and obligation of the Government.

Provided, however, that the license granted by this Article shall not convey any right to the Government to manufacture, have manufactured or use subject inventions for the purpose of providing services or supplies to the public in competition with Contractor in Contractor's fields of activity.

(c) Contractor agrees (i) to deliver to the Contracting Officer or his designee, promptly and in any event prior to final settlement, a complete written disclosure of each Subject Invention which reasonably appears to be patentable and as to which Contractor shall possess the right to grant to the Government the license referred to herein without the Contractor becoming obligated to pay royalty or other compensation to others solely on account of said grant, and, as to each such invention to exert its best efforts to effect such delivery within six months after first publication, public use or sale; (ii) to designate, at the time of such delivery, whether or not said invention has been or will be claimed in a patent application, and to file or cause to be filed in due form and time an application covering each such invention affirmatively so designated, or promptly advise the Contracting Officer in the event that Contractor does not intend to file an application thereon; (iii) to furnish to the Contracting Officer or his designee, on request, copies or an irrevocable power to inspect and make copies of each patent application filed by or on behalf of the Contractor covering any Subject Invention: (iv) to deliver to the Contracting Officer or his designee, duly executed, such instruments of assignment, application papers and rightful oaths, prepared by the Government, as may be necessary to vest in the Government (but, as hereinabove provided, only to the extent of Contractor's right to do so without incurring any obligation to pay royalty or other compensation solely on account of such assignment) the sole and exclusive ownership in, and the right to apply for and prosecute patent applications covering, each Subject Invention which Contractor does not affirmatively designate as aforesaid (subject, however, to the reservation of a non-exclusive and royalty-free license thereunder to Contractor which license shall be assignable to the successor of that part of

> Contractor's business to which it pertains); and (v) to deliver to the Contracting Officer or his designee, duly executed, such instruments of license, prepared by the Government, confirmatory of any license rights herein agreed to be granted to the Government, as the Contracting Officer or his designee may require.
>
> (d) Contractor agrees insofar as it has or may acquire the right to do so without incurring any obligation to pay royalty or other compensation to others solely on account of said grant, to grant and does hereby grant to the Government, the right to reproduce, use and disclose for any governmental purpose all or any part of of the reports, drawings, blueprints, data and technical information to be delivered by Contractor to the Government under this contract; provided, however, that nothing contained in this sentence shall be deemed to grant a license under any patent now or hereafter issued.

39. On March 26, 1948, Col. V. G. Huston, USAF, Chief, Aeronautical Equipment Section, Procurement Division, AMC, Wright Field, prepared a memorandum entitled "Deviation to Article 39, Retroactive Price Revision, Contract W33-038 ac-20375, Allison Division, GMC." The memorandum stated:

> 1. A deviation is set forth under paragraph g. of Article 39, Retroactive Price Revision, which reads as follows: "For the purpose of Price Revision under this Article, all costs which have been incurred by the contractor in anticipation of this contract on and after 1 April 1947, and prior to the signing thereof, and which would have been considered as allowable items of cost under this Article, shall be allowable items of cost hereunder."
>
> 2. It was mutually agreed between both parties that the electronic power controls procured under this contract were urgently required for the following reasons, although the contractor was never told verbally or in writing to proceed:
>
> a. The use of electronic power controls is a safety measure as well as the fact that it decreases cost of maintenance.
>
> b. It controls the temperature on acceleration of engines by direct measurements and prevents over temperatures or compressor stalls.
>
> c. The electronic power control acts as a long range governor as well as a temperature control.
>
> 3. The contractor has incurred cost of approximately $40,000.00 prior to the receipt of this contractual docu-

> ment. It is the feeling of personnel at Air Materiel Command that * * * the money spent by the contractor prior to signing of this formal document was in the interest of the Government. It can be stated that one control is presently at Muroc Air Base, California and is being tested by the contractor's personnel.

40. A summary of Thompson Products' electronic control costs, dated April 29, 1948, states as follows:

> All costs are from starting date of projects through March, 1948:
>
> *Thompson Projects*
>
> * * * * *
>
> | | |
> |---|---|
> | 230. Work Associated with Offner Control (8–47) | $3,224 |
>
> * * * * *
>
> *Offner Projects billed to Thompson*
>
> | | | |
> |---|---|---|
> | X–630 | (This covers all work done by Offner for Allison project in 1947 at request of Thompson. Prior to this he was working on direct A.A.F. contract.) | 26,938 |
> | 630–XS | Offner Proportional Solenoid (1–48) | 1,052 |
> | 630X–7 | Electronic Jet Control (1–48) | 6,443 |
>
> * * * * *
>
> *Allison Contract*
>
> * * * * *
>
> | | |
> |---|---|
> | Service test units | |
> | Thompson | $4,200 |
> | Offner | 1,000 |
> | | $5,200 Each |

41. An interoffice letter dated May 7, 1948, from F. E. Smith, Project Engineer for Thompson Products, to T. R. Thoren of Thompson Products, stated as follows:

> Allison received the following wire from Wright Field:
>
> "Reference contract W33–038AC20375 information received from Muroc AAB indicates recent progress on tests of Thompson Offner control to be unsatisfactory. Request any action to expedite test program be taken as test of Eclipse-Pioneer control is to be made on same airplane MCREX–P61"
>
> Mr. Cripe expressed the opinion that Dr. Offner should be at Muroc.

Shortly thereafter, Offner went to Muroc to assist in supervision and evaluation of both ground and flight tests. Offner participated in such tests through mid-1948.

42. By purchase order agreement H-2076, dated May 11, 1948, Allison ordered from Thompson Products one Thompson-Offner electronic power control, along with copies of prospective reports to be prepared by Thompson Products as a result of bench and flight tests to be conducted with the control. The purchase order noted an attached article, designated "EX. REL. 4400 A Contract W33-038-ac-20375", and further stated as follows:

> The article attached hereto [*i.e.*, EX. REL. 4400A] is hereby made a part of this order and you are to be considered the contractor with respect to this article.—per Thompson Products' proposal dated 3-25-47 and revised 8-11-47. [Finding 27]

The article designated EX. REL. 4400A, attached to the purchase order, was captioned "Thompson-Offner Electronic Power Control" and stated in part:

> For U.S. Air Force Contract No. W33-038 ac-20375 purchase the following from Thompson Products Inc. * * * This EX Release covers test reports for a laboratory model fuel control, and the purchase of a flight model control, and the purchase of a flight model fuel control, with test reports and drawings, all to be furnished by Thompson Products. * * * The following material is ordered in accordance with U.S. Air Force Contract No. W33-038ac-20375 and Thompson Products proposal dated March 25, 1947 and revised August 11, 1947:

*   *   *   *   *

The article then set out in detail the materials to be furnished, in accordance with Contract No. W33-038ac-20375, and concluded with the following note:

> Purchase Order should include any other Article from contract W33-038ac-20375 deemed necessary, particularly Article 41, Patent Rights.

43. A telegram dated May 23, 1948, from Thoren of Thompson Products, to Colwell of Thompson Products, with copies to F. F. Offner and F. E. Smith of Thompson Products, stated as follows:

> I have advised Don Cripe of Allison and Clayton of Muroc that Offner is in complete charge of Thompson

> Products part of test program effective yesterday. Ground running will continue Monday. However decision for flight is now up to Offner and Allison.

On May 24, 1948, Thoren sent a letter to D. W. Cripe of Allison, stating essentially the same information as in the May 23rd telegram.

44. By letter dated May 24, 1948, W. R. Chapman, Development Engineering Department of Thompson Products, sent Offner a copy of the purchase order agreement H–2076, noted in finding 42. Chapman noted the concern of Thompson Products that the test reports, called for by the agreement, be timely prepared. The letter stated in part:

> As a reminder, during your last visit here, we discussed your bench test report as including a description of your mock-up tests and perhaps generator and temperature sensing unit characteristics.
>
> For the item of "resulting study" (of Wright Field Tests), we plan including a discussion of all component modification which went into the integral control.
>
> I believe you ran some more mock-up tests and electronic component tests which should satisfy Allison requirements.
>
> The following is a brief outline of our report plans:
>
> A. First bread-board model tested at Wright Field May 1947.
>   1. Bench tests
>   (a) Offner
>   (b) Thompson
>   2. Wright-Field test
>   3. Resulting study
>   (a) Offner
>   (b) Thompson
>   4. Description (Optional—very brief to include photograph, schematics and etc. if written)
>
> B. Integral Control
>   1. Bench tests
>   2. Allison engine tests
>   3. Resulting study or changes
>   4. Description
>
> C. Flight tests

45. A letter from Thoren of Thompson Products, to Offner dated June 22, 1948, stated as follows:

> We have the Allison purchase order No. H–2076 dated May 11, in which item #1 reads:
>
> "Report—5 copies including 1 reproducible covering

bench tests conducted by Thompson Products or any of its sub-contractors, * * *

Delivery of report required at once."

Please complete the report required by the above item #1 at your earliest convenience so that we may bill Allison for this phase of their purchase order.

46. In about July 1948, Allison was considering terminating flight tests with the Thompson-Offner control so that tests could be made with the Eclipse-Pioneer control. A letter from Offner to AMC, Wright Field, dated July 6, 1948, stated in part as follows:

> 1. Subject control [*i.e.*, the Thompson-Offner control] is being developed jointly by this company and Thompson Products, Inc. Flight tests of control, at Muroc, began on 15 April 1948, on airplane type XB-43.
>
> 2. Consideration is now being given by the A.M.C. to terminating subject tests, at least temporarily, on 15 August 1948. It is the belief of this company that this is based on the recommendation of Allison Engine Division. It is further the belief of this company that termination of these tests on the above date, or any other arbitrarily chosen date, is undesirable. The reasons for this follow.
>
> 3. Subject tests have now been in progress for about ten (10) weeks. This is a relatively short time, as flight tests go. However, the *effective* time has been greatly reduced by several factors:
>
> a. The airplane type XB-43 is the first of its type, and there were considerable delays in making flights, in addition to delays normally incident to flight tests.
>
> b. The two J-35 engines successively installed in the XB-43 for control test were defective. Malfunctioning was at first attributed to the control, and later traced to to the engine. After each engine change, it was felt desirable to begin the flight test again from the start. The first flight with the present engine, this flight being the first called for in the flight test request, was made on 15 June.
>
> c. Instrumentation troubles have been encountered on the program, so that several flights have been of little value, as no records were obtained. We now believe this problem has been satisfactorily solved by having our personnel cooperate with Muroc personnel in checking this equipment.
>
> 4. The delays enumerated above, occurred despite the excellent and efficient cooperation of all Muroc personnel concerned.

> 5. Although the first completely effective flight was made on 15 June, information of some value was obtained before that date, and particularly, the previous flights were of value in education of personnel.
>
> 6. This company has been working on the development of an electronic control for jet engines since 1943, and has been working in cooperation with the AMC thereon, since 1945. A portion of this work has been under contracts, but considerable portion on a voluntary cooperative basis. For the last 18 months, Thompson Products has been actively and intensively working on this project. The present tests are the culmination of this work, and are an essential portion of the developmental program.
>
> 7. The Thompson-Offner electronic control is based on principles previously untried in jet engine control, and accordingly, some basic investigation is required. Already, information of some importance in regard to blowout and compressor surge has been gained.
>
> 8. It is recognized that Allison Engine Division has other responsibilities to the AMC, such as to test the Eclipse-Pioneer control. However, in view of the long cooperative effort previously existing between our company and the AMC, it is not believed that any such other considerations should be allowed to interfere with subject tests.

* * * * *

47. By letter dated July 23, 1948, Colwell of Thompson Products, requested Offner to expedite the preparation of reports and test analyses, as called for in Allison purchase order agreement H-2076, for the following reasons:

> The development costs of subject project have far exceeded our original estimate. For this reason we are obliged to contact Allison Division with a request that they negotiate with Wright Field for additional funds.
>
> After briefing over our present purchase order, I have reached the conclusion that our position in the matter of additional funds would be much stronger if we could supply drawings and reports called for, which are now overdue.
>
> Furthermore this would allow us to collect a portion of the present purchase order price. We have received a letter from Mr. Hazen at Allison requesting these data, so that they can request partial payment of Wright Field.
>
> I have therefore instructed my engineers to prepare such data, and wish to take this means of requesting your portion of it.

> Refer to Item 1 of our purchase order, a copy of which is attached. Our report is in rough draft form, and can be finished promptly if you will supply the information requested by letter from W. R. Chapman dated May 24, 1948. This will allow us to collect the $18,450 for Item 1.
>
> * * * * *
>
> It would expedite matters considerably and enhance our chances of obtaining more funds if you could furnish the above information soon.

48. By letter dated August 11, 1948, Offner requested from Rudolph Bodemuller of AMC, Wright Field, certain information regarding the operational characteristics of the J-35 engine. By letter dated August 23, 1948, AMC replied as follows:

> 1. This is in reply to your letter of 11 August 1948, reference FFOffnerPhD/hl regarding the above subject. Your letter specifically requested information from which to design the speed setting mechanism of the electronic power control to obtain linear thrust output in relation to throttle position.
> 2. Since this is a matter pertaining directly to work being accomplished on Contract W33-038-ac-20375 with Allison Division and on possible future engine models, it is suggested that the desired information be obtained from Allison Division.

49. By letter dated September 3, 1948, R. M. Hazen, Director of Engineering of Allison, wrote Thompson Products that the test program on the Thompson-Offner control would not be continued beyond the current year. Thompson Products was advised to "confine any expenditures you may make to only those which you consider desirable from Thompson's standpoint and the completion of the above contractual items." By letter dated September 7, 1948, to AMC, Hazen noted as follows:

> 1. For your information we are enclosing copy of our letter of 3 September 1948 to Thompson Products, Inc., Attention Mr. A. T. Colwell, on the subject of the Thompson-Offner Electronic Turbo-Jet engine control. The writer advised Mr. Colwell verbally that we concurred with the Power Plant Section's analysis of the status of the control in that we did not feel it had demonstrated sufficient advantages as compared with other controls or a degree of reliability of satisfactory flight operation to warrant specifying the Thompson-

> Offner control on a "down-the-road" production model engine. We trust the above matter has been handled to your satisfaction and in accordance with your desires.
>
> 2. We did not ask Thompson Products as to whether they would be in a position to furnish three additional controls after we have completed the evaluation of the Thompson-Offner version and the Bendix Eclipse on flight tests inasmuch as it would appear that this should be taken up at a later date if the test results warrant it. We will continue work on the subject control contract in accordance with the present contractual items.

50. (a) Sometime after September 1948, Allison terminated its tests of the Thompson-Offner control. Thompson Products then prepared a report, Serial No. 1728, in compliance with the requirements of Contract W33–038 ac–20375 and purchase order agreement H-2076. The report was deemed unacceptable by AMC because it inadequately described the control, its basic control principles and its methods of operation. Thompson Products also prepared a report, Serial No. ER–1742, which listed the various tests reports prepared by Thompson Products and Offner between October 1947 and October 1948 on progress of development of the Thompson-Offner control.

On March 2, 1949, report Serial No. 1728 was discussed by personnel of Allison and AMC. It was agreed that AMC would accept the report as adequate to describe the control up to flight testing, but that a further report describing the flight test model was necessary to meet the requirements of Contract W33–038 ac–20375 and purchase order agreement H–2076.

(b) In a report, Serial No. ER–1725, prepared by Thompson Products sometime between mid-and-late 1948, the organization and procedures of the Thompson-Offner fuel control project were reviewed. An organization chart included in the report showed "Offner Products Inc." and "Thompson Products Inc." at the top of the chart as parallel organizational units. Under "Thompson Products Inc.", there was shown an organizational pyramid indicating the various subdivisions of Thompson Products having responsibilities for the project. The report noted that, "[t]he organization chart indicates the general line of work assignment, control, and coordination" and "[t]he coordination of the program is generally carried out as indicated by the lines on the organization chart." All this suggests that Offner Products Inc. and Thompson Products were project participants of equal status, control and responsibility.

51. On June 29, 1949, Offner Products Inc. and Thompson Products terminated their license agreement of March 5, 1947 (finding 26). The termination agreement stated, among other things, as follows:

> 3. Thompson represents that it has entered into only one contract in connection with the subject matter of the aforesaid License Agreement which contract was with the Allison Division of General Motors Corporation and involved a total amount of $48,900.00, and Offner represents that it was to be paid the sum of $21,305.00 as its share of said amount. Offner has actually received approximately $38,188.17 from Thompson towards its own development expenses, leaving approximately $16,383.17 [$16,883.17(?)] which has been contributed by Thompson to Offner's own development expenses. Thompson represents that it received one purchase order covering the actual time and expenses of several of its employees in connection with the further development of the subject matter of said License Agreement. Thompson further represents that it will ship to Offner, within one week from the date of this agreement, the 630X8 Serial No. 1 Electronic Signal Generator Control.

52. (a) In response to inquiries from AMC regarding the Patent Rights Clause of Contract W33-038 ac-20375, C. H. Willits, Director of the Patent Section of General Motors Corporation, by letter dated March 15, 1950, advised AMC that "no inventions are known to have been made by our Allison Division during the performance of the subject contract." The letter further stated:

> The Patent Rights Article was accepted by Thompson Products, Inc., in connection with Purchase Order H-2076, issued by Allison on May 11, 1948.
>
> * * * * *
>
> It is understood that if any contact with the subcontractors is needed it will be handled directly by you.

(b) In response to inquiries from AMC regarding the Patent Rights Clause in Contract W33-038 ac-20375 and purchase order agreement H-2076, A. T. Colwell of Thompson Products, by letter dated April 18, 1950, advised AMC as follows:

> 1. There was no "subject invention" as defined in Purchase Order H-2076; and
> 2. There was no subcontract issued in connection with said purchase order containing a patent rights article.

ULTIMATE FINDINGS AND CONCLUSIONS

53. An invention is conceived, within the meaning of the patent law, when the inventor has a "definite idea of a complete and operative invention as it is thereafter to be reduced to practice * * *." 1 WALKER, PATENTS § 45 at 191–92 (Deller's 2d ed. 1964); *Technitrol, Inc.* v. *United States*, 194 Ct. Cl. 596, 440 F. 2d 1362, 169 USPQ 732 (1971). The inventions defined in claims 3, 4 and 5 of the '809 patent were conceived (i) no earlier than July 25, 1944, as evidenced by laboratory notebook entries showing a rudimentary fuel control having a null-balance speed control circuit and temperature override circuit (finding 11), and (ii) no later than December 1946, at which time a fuel control unit for full bench testing was completed (finding 18(b)).

54. (a) An invention is actually reduced to practice when it is put into physical form and shown to be operative in the environment of its practical contemplated use. *Elmore* v. *Schmitt*, 278 F. 2d 510, 125 USPQ 653 (CCPA 1960). Laboratory tests, rather than tests under actual use or service conditions, may be sufficient to constitute actual reduction to practice if the conditions of the tests adequately simulate the conditions of practical use. *Paivinen* v. *Sands*, 339 F. 2d 217, 144 USPQ 1 (CCPA 1964). *See also* PATENTS AND TECHNICAL DATA 42–52 (Gov't Contracts Monograph No. 10, Geo. Wash. Univ. Contracts Program 1967).

(b) The tests conducted by Offner in 1944 on the laboratory mockup (findings 10–12) did not constitute an actual reduction to practice of the inventions defined in claims 3, 4 and 5 of the '809 patent because the tests were not run on a gas turbine engine or any other device in which the control operated in response both to a "voltage signal" produced by a "rotating member" and an "operating parameter of the rotating member other than speed [*e.g.*, temperature]." Furthermore, the tests did not simulate the environmental conditions of gas turbine operation; nor was the "operating parameter * * * other than speed [*e.g.*, temperature]" of the laboratory mockup simulated in such manner as to show the workability of the device under conditions of practical use or service. *See Gaiser* v. *Linder*, 253 F. 2d 433, 117 USPQ 209 (CCPA 1958).

(c) The test conducted by Offner at Wright Field in June 1945 (finding 14) did not constitute an actual reduction to practice of the inventions defined in claims 3, 4 and 5 of the '809 patent because (i) the temperature override circuit was not tested, in conjunction with the speed control circuit, under actual engine operating conditions, so to establish that the control would function in a stable and satisfactory manner under varying conditions of gas turbine operation and (ii) the evidence does not establish with reasonable certainty whether the control circuitry, in existence at that time, would have operated satisfactorily if complete tests had been run.

(d) The bench tests run with the Offner control designated 630X5 at Allison in January 1947 on a J-33 turbojet engine (finding 18) constituted the first actual reduction to practice of the inventions defined in claims 3, 4 and 5 of the '809 patent because the speed control circuit was tested in conjunction with the temperature override circuit under actual and varying conditions of gas turbine operation, which conditions adequately simulated (for purposes of testing, in conjunction, the speed control circuit and temperature override circuit) the practical use of a gas turbine engine. Flight tests were not required for an actual reduction to practice because (i) the scope of the '809 patent, and particularly claims 3, 4 and 5, embraces practical operation and use of the fuel control with stationary gas turbine engines as well as jet aircraft engines, and (ii) the variation in operating parameters of the engine in the bench test (speed, temperature, etc.) was sufficient to prove the operability, stability and reliance of the invention for practical use. *Elmore* v. *Schmitt*, *supra; Farrand Optical Co.* v. *United States*, 325 F. 2d 328, 139 USPQ 249 (2d Cir. 1963): *cf. Chandler* v. *Mock*, 150 F. 2d 563, 66 USPQ 209 (CCPA 1945).

55. On June 20, 1946, Offner Electronics Inc. and the United States entered into Contract W33-038 ac 15202. The contract was completed in about late May 1947. Accordingly, the inventions defined in claims 3, 4 and 5 of the '809 patent were first actually reduced to practice during such term. (Findings 17(a), 20, 53, 54)

56. The inventions defined in claims 3, 4 and 5 of the '809 patent were first actually reduced to practice in performance of Contract W33-038 ac 15202 and, accordingly, were "Subject Inventions" within the meaning of the contract's Patent Rights clause. (Finding 17(b)) Therefore, the United States is licensed to practice the inventions defined in claims 3, 4 and 5 of the '809 patent.

57. The inventions defined in claims 11 and 35 of the '908 patent were conceived in or about late December 1947—early January 1948. (Finding 22)

58. The inventions defined in claims 11 and 35 of the '908 patent were first actually reduced to practice in September 1948 in flight tests on an Air Force B-43 aircraft at Muroc Air Base, Muroc, California. (Finding 24)

59. (a) On March 15, 1948, Allison and the United States entered into Contract W33-038 ac-20375 which contained a Patent Rights clause. On May 11, 1948, Allison and Thompson Products entered into a subcontract, designated purchase order agreement H-2076, pursuant to the terms and conditions of Contract W33-038 ac-20375. By virtue of the subcontract, Thompson Products became bound by the Patent Rights clause of Contract W33-038 ac-20375. (Findings 38, 42, 52)

(b) Contract W33-038 ac-20375 and the subcontract H-2076 were completed sometime after September 1948. Accordingly, the inventions defined in claims 11 and 35 of the '908 patent were first actually reduced to practice during the term of the contract and subcontract. (Findings 50-52, 58)

60. Between March 5, 1947 and June 29, 1949, Thompson Products was the exclusive licensee under inventions made by Offner relating to electronic fuel controls, which inventions ultimately became the subject of the '809 and '908 patents. (Findings 26, 51)

61. Thompson Products did not enter into an express written subcontract, partnership or joint adventure agreement with Offner or Offner Electronics Inc. with respect to development of the Thompson-Offner electronic fuel control pursuant to Contract W33-038 ac-20375 and subcontract

H–2076. Nor was Offner an "employee" of Thompson Products within the meaning of the contract or subcontract. However, the evidence of record establishes that, by operation of law based on the conduct of the parties, Thompson Products was a joint adventurer with Offner and Offner Electronics Inc. in performance of the contract and subcontract. In particular, the following factual indicia establish a joint-adventure relationship:

(a) Sharing of profits and losses

(i) Offner Electronics Inc. and Thompson Products agreed to share, on the basis of a 45/55% split, respectively, the proceeds to be paid by Allison to Thompson (and thus derived from the United States) pursuant to subcontract H–2076. (Findings 33, 51) *See Tansil* v. *Horlock*, 204 So. 2d 457 (Miss. 1967).

(ii) Offner Electronics Inc. billed Thompson Products for costs (without profit) incurred from January 1, 1947 to December 17, 1947 ($26,937.95) toward development of the Thompson-Offner control and in anticipation of subcontract H–2076. Such costs were to be deducted from the amount due Offner, under the 45/55% split, when Thompson Products received payment from Allison. (Findings 32, 34, 40)

(iii) Thompson Products ultimately paid Offner Electronics Inc. about $38,188.17 for development of the Thompson-Offner control, a substantial portion (if not all) of which was moneys paid to Thompson Products by Allison (and thus derived from the United States) under subcontract H–2076. Part of the moneys paid to Offner Electronics Inc. covered work done during the period January 1, 1947 to July 1, 1947, which was before the effective date of Contract W33–038 ac-20375 or subcontract H–2076; but the moneys were paid in anticipation of the granting of the contract and subcontract. Most of the moneys paid by Thompson Products to Offner Electronics Inc. was for work done directly pursuant to and during the term of Contract W33–038 ac–20375 and subcontract H–2076. (Findings 38, 39, 51) *See* 2 ROWLEY ON PARTNERSHIP §§ 52.8–52.10 (2d ed. 1960).

(b) Joint control and community of interest

(i) Offner, Offner Electronics Inc. and Thompson Products cooperated as joint entrepreneurs in developing the Thompson-Offner electronic fuel control system. Each brought to the development project particular expertise, skills and manufacturing capabilities. Offner and Offner Electronics Inc. provided expertise and hardware for the electronic portion of the system; and Thompson Products provided expertise and hardware for the mechanical and hydraulic portions of the system. Each exercised technical and managerial control and responsibility indicative of equal status in the project. (Findings 18(a), 22–24, 26–29, 31, 35, 46, 50(b)) *See Wood* v. *Western Beef Factory, Inc.*, 378 F. 2d 96 (10th Cir. 1967); 2 ROWLEY ON PARTNERSHIP §§ 52.11–52.12 (2d ed. 1960); 46 AM. JUR. 2d *Joint Ventures* § 12 (1969).

(ii) Offner, Offner Electronics Inc. and Thompson Products participated jointly in testing, both bench and flight, of the Thompson-Offner control; and they participated jointly in the preparation of test reports for the Government, pursuant to the terms and requirements of Contract W33–038 ac–20375 and subcontract H–2076. (Findings 24, 31, 35, 41, 43–47, 50(a))

62. As joint adventurers, by operation of law, with Thompson Products, Offner and Offner Electronics Inc. were bound by the Patent Rights clause of Contract W33–038 ac–20375, as incorporated in subcontract H–2076. *See Lentz* v. *United States*, 171 Ct. Cl. 537, 346 F. 2d 570 (1965); *Bushman Constr. Co.* v. *Air Force Academy Housing, Inc.*, 327 F. 2d 481 (10th Cir. 1964); 2 ROWLEY ON PARTNERSHIP §§ 52.56–52.57 (2d ed. 1960); 46 AM. JUR. 2d *Joint Ventures* § 57, at 77 (1969).

63. The inventions defined in claims 11 and 35 of the '908 patent were first actually reduced to practice in performance of Contract W33–038 ac–20375 and subcontract H–2076, and accordingly were "Subject Inventions" within the meaning of the Patent Rights clause of such contract and subcontract. Therefore, the United States is licensed to practice the inventions defined in claims 11 and 35 of the '908 patent.

64. Alternatively, even if it be assumed that Offner and Offner Electronics Inc. were not joint adventurers with Thompson Products in the development of the Thompson-Offner fuel control, the United States is nevertheless entitled to an implied license under claims 11 and 35 of the '908 patent by virtue of the following facts:

(a) Offner and Offner Electronics Inc. were intimately involved in discussions, negotiations and activities directed toward the granting of Contract W33–038 ac–20375 and subcontract H–2076, which discussions, negotiations and activities were aimed at securing Government funds for further development of the

Thompson-Offner fuel control. (Findings 27, 29, 32, 33, 35, 40)

(b) Offner and Offner Electronics Inc. had knowledge that development work on the Thompson-Offner fuel control being done in 1947 and early 1948 (before the date of Contract W33-038 ac-20375), was, in large measure, in anticipation of a forthcoming Government contract which, in effect, was a continuation of Offner's earlier contract with the Government (*i.e.*, Contract W33-038 ac 15202). Offner and Offner Electronics Inc. also knew that work done after the date of Contract W33-038 ac-20375 was in pursuance of that contract, as well as subcontract H-2076. (Findings 27, 29, 32, 41, 43-47, 50(a), 51)

(c) Offner and Offner Electronics Inc. intended to be and, in fact, were paid for a substantial part of their development work on the Thompson-Offner fuel control by funds derived from the United States, pursuant to Contract W33-038 ac-20375 and subcontract H-2076. (Findings 32-34, 39, 47, 51)

(d) The inventions defined in claims 11 and 35 of the '908 patent were first actually reduced to practice in the course of performing Contract W33-038 ac-20375 and subcontract H-2076, and with materials and personnel furnished, in part, by the United States. (Finding 24)

See Ordnance Eng'r Corp. v. *United States*, 68 Ct. Cl. 301, 352-53 (1929), *cert. denied*, 302 U.S. 708 (1937); *Mine Safety Appliances Co.* v. *United States*, 176 Ct. Cl. 777, 364 F. 2d 385, 150 USPQ 453 (1966); *Technitrol, Inc.* v. *United States*, *supra.*

CONCLUSIONS OF LAW

Upon the foregoing findings of fact and ultimate findings and conclusions, which are made a part of the judgment herein, the court concludes as a matter of law that—

(1) defendant is fully licensed under claims 3, 4 and 5 of Patent No. Re. 24,809, and

(2) defendant is fully licensed under claims 11 and 35 of Patent 2,697,908, and

(3) as to said claims the petition is dismissed.

The case is remanded to a trial commissioner for further appropriate proceedings in view of the stipulation of the parties noted in finding 2.

APPENDIX B

In the United States Court of Claims
Technical Development Corporation and
Franklin F. Offner,
Plaintiffs.
v.
The United States,
Defendant.

No. 174-64

Motion for Rehearing Under Rule 151

Now come the plaintiffs, by their attorney, and move the Court under Rule 151 for a rehearing to alter or amend the Court's opinion of June 20, 1973 or to take additional testimony.

A. Specifically, it is requested that the Court's Opinion at page 5, lines 36 to 39 which states:

> ". . . It [Defendant] also contends that the United States is licensed under both patents by virtue of Patent Rights clauses in two Government contracts performed during the 1940's."

be amended to strike this incorrect statement and to substitute the following facts as supported in the record:

1) Defendant did *not* contend that the United States is licensed under *both* patents (i.e. Re. 24,809 and 2,697,908) by virtue of Patent Rights clauses in *two* Government contracts (i.e. Contract W33-038 ac 15202 and Contract W33-038 ac 20375).

2) Defendant contended only that the United States is licensed under both patents by virtue of a Patent Rights clause in Contract W33-038 ac 20375.

B. Additionally, it is requested that the Court's Opinion at page 13, lines 1 to 8 which states:

> "Against this factual backdrop, defendant contends that the United States is licensed under the

> inventions of the '809 patent. While not contending that the inventions were 'conceived' in performance of Contract W33-038 ac 15202, defendant says they were 'first actually reduced to practice' in such performance and within the meaning of that contract's Patent Rights clause."

be amended to strike this incorrect statement and to substitute the following facts as supported in the record:

1) Defendant did *not* contend that the '809 patent was licensed under the Patent Rights clause of Contract W33-038 ac 15202.

2) Defendant did *not* contend that the inventions of the '809 patent were "first actually reduced to practice" in the performance of Contract W33-038 ac 15202.

3) There was no trial of an issue of license defense under Contract W33-038 ac 15202.

C. It is further requested that the Conclusions of the Court, at page 71, that:

> "1) defendant is fully licensed under claims 3, 4 and 5 of Patent No. Re. 24,809 . . ."

which is predicated on the errors of fact noted above, be modified to conclude that the defendant is not licensed under Patent No. Re. 24,809.

If this Motion for Rehearing is subject to Court of Claims Rule 7(d) (amended July 1, 1973), plaintiffs suggest a rehearing en banc, because the Court's decision to which this Motion relates was rendered en banc.

Memorandum in Support of Motion

On June 20, 1973, this Court adopted the trial Commissioner's Opinion and Findings of Fact, and concluded that:

> "1 defendant is fully licensed under claims 3, 4 and 5 of patent No. Re. 24,809, and

2) defendant is fully licensed under claims 11 and 35 of patent No. 2,697,908." (page 71*)

This Motion for Rehearing is directed to the first of the Court's conclusions, namely that the defendant is licensed under patent No. Re. 24,809.

A. Procedural Facts Stated Incorrectly In Commissioner's Opinion

The Court's opinion adopts the Commissioner's Opinion as the basis for its judgment in the case (page 1). The Commissioner's Opinion incorrectly states certain procedural facts. These incorrect facts serve as the foundation on which this Court concluded that the license issue was properly tried, and that the defendant is licensed under the '809 patent by virtue of the patent rights clause in contract W33-038 ac 15202. The true facts do not support a conclusion that plaintiff actually or impliedly consented to trial of the issue of a license defense under this contract (-15202). Since the Commissioner found that the '809 patent is not licensed under Contract W33-038 ac 20375, plaintiff is entitled to recover compensation, if the '809 patent is valid and infringed.

B. Defendant Did Not Assert License Defense Under Contract W33-038 ac 15202

On page 13 of the Court's Opinion, which is a portion of the Commissioner's Opinion, it is stated in regard to the inventions of the '809 patent:

> ". . . defendant says they were 'first actually reduced to practice' in such performance [of contract W33-038 ac 15202] and within the meaning of that contract's Patent Rights clause. Defendant argues that the first actual reduction to practice occurred . . . in 1948, . . ."

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* Refers to page of Court's opinion, June 20, 1973.

The first sentence of the Commissioner's statement is unsupported in the record[1] and is inconsistent with the second sentence quoted above. The Commissioner found that Contract W33-038 ac 15202 was completed in late May 1947 (Finding 20, page 44), which is prior to the date defendant argues the first actual reduction to practice took place. Defendant did not assert in its brief that the '809 invention was licensed under the Patent Rights clause of contract W33-038 ac 15202, and the first sentence of the Commissioner's statement quoted above is clearly in error.

The entire controversy of the license defense revolved around the subsequent contract W33-038 ac 20375 between Allison and the United States, which was executed March 15, 1948 (page 54). In their briefs before the Commissioner, the parties argued the issue of license under the second contract (-20375). The Commissioner made a finding that the inventions defined in claims 11 and 35 of plaintiff's second patent, No. 2,697,908, were first actually reduced to practice during the term of the second contract (-20375) and the Thompson Products subcontract (Finding 59(b), page 68). The Commissioner then proceeded to find these claims of the second patent to be licensed on the basis of a joint venture between plaintiffs and Thompson Products because Thompson Products was bound by the Patent Rights clause of the Allison contract (-20375) (Finding 38, page 68). As an additional ground for finding a license under the '908 patent, the Commissioner referred to certain pre-contract negotiations involving plaintiffs, Thompson Products, and Allison, and concluded the defendant is entitled to an implied license. Neither the joint venture nor the implied license theory relates to the first patent, Re 24,809, or the first contract (-15202). The Commissioner specifically found that the invention of the first patent, No. Re 24,809, was first actually reduced to practice prior to the second contract (-20375) (Finding 55, page 67).

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[1] See pages 65-67. Defendant's Brief reproduced herein at page 7.

The Court's denial of plaintiff's motion to refer the case back to the Commissioner for further evidence was based on the conclusion that the "plaintiffs had or should have had a clear understanding of the thrust of the defendant's license defense," (page 3). While this may have been true as to the second contract (-20375), there was nothing in the proofs introduced by defendant, or in its brief, that suggested a defense of license under the first contract (-15202). Because of the errors in the Commissioner's Opinion (page 13), it is believed that the Court was under the impression that the defendant had asserted that one or both of the patents was licensed under the first contract, contract W33-038 ac 15202.

Under the Patent Rights clause, (pages 40-41) the government receives a license only in the event that the invention is: (1) conceived, or (2) first actually reduced to practice while performing the work specified in the contract. The defendant conceded that the '809 invention was not conceived under the first contract (-15202) (page 13). The defendant asserted in its brief before the Commissioner that the '809 patent was first actually reduced to practice in 1948 under the second contract (-20375):

> "J. The First Actual Reduction to Practice of the '809 and '908 Patented Inventions Was in the 1948 Government-Sponsored Flight Testing Program
>
> * * *
>
> "By way of summary, the flight testing program technically (after Contract AC-20375 execution) began in March 1948 and extended until September 1948 at Muroc (Edwards) AFB.
>
> * * *
>
> "By stipulation of the parties, the Court exhibits introduced and accepted into evidence clearly are to be taken

as the statement of the party making them as if he was on the witness stand. Thus, all documents written by Cripe and Hazen of the Allison Division are to be understood as corroboration by a disinterested witness of tests made in 1948.

* * *

". . . All of the claim limitations of the '809 patented invention were met by the control utilized in the flight testing program (IT. 226, 233). Therefore, in view of the workability of the control in its intended environment, the '809 patented invention was first actually reduced to practice in the 1948 flight testing program.

". . . the first actual reduction to practice of the '809 invention, of which each claim limitation was met by the test (T. 200-207, PX AII), occurred during the first stall preventing flight test in September 1948 (T. 206-208). . . . It is respectfully submitted, therefore, that plaintiff first actually reduced his inventions to practice during the 1948 Government sponsored flight testing program."

Defendant's Brief p. 65-67

The parties were in agreement until the date of the Commissioner's Opinion and Findings of Fact (October 1, 1971) that the "license issue" referred only to the issue of whether one or both of the patents was licensed under the second contract W33038 ac 20375.

C. Plaintiffs Were Prejudiced by the Commissioner's Failure to Follow Rules 37(b) and 38(h)

Under Rule 37(b) there is a requirement that the defense of license be set forth affirmatively, and Rule 38(h) states that a party waives all defenses which he does not present either by motion or in his answer or reply.[2] At no time has defendant sought to amend the pleadings to assert an affirmative defense of license under the first contract (-15202). Plaintiffs have a right to rely upon the fact that procedure before the Commissioner will be governed by these rules of the Court.

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[2] Rule 39(b) does not alter this requirement—see page 10.

Plaintiffs were prejudiced by the Commissioner's voluntary finding of a license under the first contract because neither party was on notice that a license under the first contract was in issue. If this case were referred back to the Commissioner, plaintiffs would prove that the engine test at Allison in 1947 (page 13) was outside the scope of the first contract (-15202),[3] and did not constitute a first actual reduction to practice under the first contract.

The Commissioner specifically noted the incompleteness of the record with regard to the tests conducted in 1945 at Wright Field before the first contract was awarded (Finding 54(c), page 67). The Commissioner stated "the evidence does not establish with reasonable certainty whether the control circuitry, in existence at that time, would have operated satisfactorily if complete tests had been run." If plaintiffs had been on notice that a license under the first contract would be asserted by the Commissioner, plaintiffs would have insisted on the right to offer evidence on the license issue under the first contract.

Court of Claims Rules 37 and 38 correspond to Rules 8 and 12, respectively, of the Federal Rules of Civil Procedure. In *Wirtz* v. *F. M. Sloane, Inc.*, 285 F. Supp. 669 (W.D. Pa. 1968), Affd. 411 F. 2d 56 (3rd Cir. 1969), the Court stated at page 675 of 285 F. Supp.:

> "The defense of exemption, assuredly an affirmative one, was not raised in the Answer, Rule 8(c), Fed. R. Civ. P., nor at trial; hence it was waived, Rule 12(h), Fed. R. Civ. P. This defense was not tried by express or implied consent of the parties. Thus, I do not think it would be proper to allow the oral amendment after judgment. An amendment after judgment stating a new defense is not permissible under the guise of conforming the pleadings to the proof. Simms v. Andrews, 118 F. 2d 803, 807 (10th Cir. 1941)."

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[3] Affidavits of Bodemiller & Schmidt—Appendix A.

Similarly, the Court stated in *Systems Incorporated* v. *Bridge Electronics Company*, 335 F. 2d 465, 466 (3rd Cir. 1964):

> "An affirmative defense which is neither pleaded as required by rule 8(c) nor made the subject of an appropriate motion under rule 12(b) is waived. Rule 12(h), 28 U.S.C.A.; [citations omitted]. The waiver is final if the defendant fails to correct the omission either prior to trial or during trial, as permitted by rule 15(a) (b) of the Federal Rules of Civil Procedure, 28 U.S.C.A. Ibid. The defendant made no application to amend the pleadings or otherwise correct the omission".

Amendment of the pleadings to allege a defense of fraud *after all of evidence was in*, was not allowed, in *Gallon* v. *Lloyd-Thomas Company* 264 F. 2d 821 (8th Cir. 1959), even though evidence supporting the defense had been introduced in support of other issues.

Rules 37 and 38 protect the plaintiff in this Court from the prejudice that results, as it did in this case, from a Commissioner deciding the case on the basis of an issue on which plaintiff had no opportunity to present evidence and be heard.

D. Court of Claims Rule 39(b) Does Not Apply

Under the true circumstances, as now presented to this Court, it is submitted that consent to the amendment of the pleadings under Rule 39(b) (pages 3, 4) cannot be implied from plaintiffs' conduct because:

1. The parties and the Commissioner specifically agreed to defer the "license issue" until after completion of the case on validity and infringement.[4]

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[4] Colloquy of Commissioner and Counsel during trial—Appendix B.

2. The only evidence offered by defendant during the period allowed by the Commissioner[5] for trial of the "license issue" were documents relating to the second contract, No. W33-038 ac 20375.[6]

3. Defendant did *not* assert in its brief before the Commissioner nor did defendant request a finding of fact that defendant was licensed under the first contract, W33-038 ac 15202.

4. Plaintiffs were prejudiced in not being allowed an opportunity to develop fully the facts prior to the Commissioner's finding of a license under the first contract.

There are very significant differences between the first contract and the second contract. Plaintiffs were a party to the first contract, while the second contract was between Allison and the United States. Different periods of time were involved, different apparatus was involved in each contract, and the proof required to meet the issue of license under the respective contracts was different.

The facts in *United States Fidelity and Guaranty Co. v. The United States*, 389 F. 2d, which was cited by this Court in its Opinion (page 4), 697 (10th Cir. 1968) differ significantly from the facts in this case, as now shown by this Motion for Rehearing. Significant factual differences include:

(1) U.S. Fidelity et al. (appellants), who were in the position of the government in this case, sought to amend their answer at the opening of the trial to allege an additional defense,

(2) Appellants offered direct evidence on the issue sought to be raised in the unpleaded defense and appellee (plaintiff herein) did not object, and

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[5] Correspondence regarding "license issue"—Appendix C.

[6] Stipulation of Documents (October 13, 1969)—Appendix D.

(3) Appellants (defendant herein) sought to re-open to allow evidence on the defense after judgment for appellee.

Perhaps the most significant fact in the *United States Fidelity and Guaranty Co. Case, supra* is that the appellee was on notice before the opening of the trial as to the issue sought to be raised by appellants. In this case, on the other hand, the government did not raise the issue of a license under the *first contract* prior to the close of proofs, or for that matter prior to the decision by the Commissioner. In this case, plaintiff did object during the trial to the introduction of any evidence relating to a "possible license defense" until a later time when defendant would inform plaintiff of what the license issue was.[7]

The mere fact that evidence which is competent and material upon the issues tried incidentally tends to prove another fact not within the issues does not justify amendment to conform the pleadings to the proof under Rule 15(b) F.R. Civ. P., *Wirtz* v. *Savannah Bank and Trust Company* 362 F. 2d 857 (5th Cir. 1966); *Simms* v. *Andrews*, 118 F. 2d 803 (10th Cir. 1941); *Standard Title Insurance Company* v. *Roberts*, 349 F. 2d 613, 620 (8th Cir. 1965); *Cox* v. *Freemont County Puible Buildings Authority*, 415 F. 2d 882, 887 (10th Cir. 1969).

CONCLUSION

It is submitted that plaintiffs have been denied due process with regard to the issue of a license under contract W33-038 ac 15202, due to factual errors in the Commissioner's Opinion. The Commissioner framed the defense of license under the first contract (15202) after the close of proof, and after the briefs had been filed. Furthermore, the Commissioner had repeatedly assured counsel for the plaintiffs that plaintiffs would be given an opportunity to be heard or to offer evidence on any license issues that the defendant might raise.

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[7] Appendix B.

The procedure followed with regard to the finding the '809 patent licensed under contract W33-038 ac 15202 was directly contrary to the requirements of Rules 37(b) and 38(h) regarding the raising of affirmative defenses and the waiver of such defenses, if not raised. The plaintiffs were prejudiced because they relied upon the application of Rules 37 and 38. Rule 39(b) is not applicable.

Accordingly, it is requested that this Court:

(1) conclude that the affirmative defense of license under contract W33-038 ac 15202 with regard to the '809 patent was waived by defendant for failure to raise the defense; or (2) in the alternative, refer this case back to the Commissioner to afford the defendant an opportunity to amend its pleadings and to permit trial of any issue raised thereby.

Respectfully submitted,

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APPENDIX C

IN THE UNITED STATES COURT OF CLAIMS

No. 174-64

Before Cowen, *Chief Judge*, Davis, Skelton, Nichols, Kashiwa, Kunzig and Bennett, *Judges*.

Order

This case comes before the court on plaintiffs' motion for rehearing under Rule 151 filed September 17, 1973, defendant's opposition to said motion filed October 2, 1973, and plaintiffs' reply filed October 12, 1973. Upon consideration of all of the points raised by the parties in these papers, it is concluded that the motion should not be granted. The opinion of the court, issued June 20, 1973, effectively and accurately disposes of all of the issues relating to license, except one raised for the first time in the instant motion wherein plaintiffs seek to have the court consider two affidavits attached to the motion. Plaintiffs deny that the affidavits represent newly discovered evidence but are "merely to show some of the relevant evidence that plaintiff could have offered if defendant had contended that it was licensed under the earlier contract (-15202), or if such an issue were formulated." Because the findings and opinion of this court dispose of this issue, the affidavits are of no value now and, in any event, could, under the rationale stated by the court, have been produced prior to decision and are now unacceptable as untimely. *General Elec. Co.* v. *United States*, 189 Ct. Cl. 116, 416 F. 2d 1320 (1969).

It Is Therefore Ordered that plaintiffs' motion for rehearing be and it is denied.

By the Court

/s/ Wilson Cowen
Wilson Cowen
Chief Judge.

No. 73-1145

In the Supreme Court of the United States

OCTOBER TERM, 1973

TECHNICAL DEVELOPMENT CORPORATION, ET AL.,
PETITIONERS

v.

UNITED STATES OF AMERICA

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CLAIMS

BRIEF FOR THE UNITED STATES IN OPPOSITION

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BRIEF FOR THE UNITED STATES IN OPPOSITION

OPINION BELOW

The opinion of the Court of Claims (Pet. App. 1-71) has not yet been reported.

JURISDICTION

The judgment of the Court of Claims was entered on June 20, 1973. A motion for rehearing was denied on October 26, 1973 (Pet. App. 84). The petition for a writ of certiorari was filed on January 23, 1974.

The jurisdiction of this Court is invoked under 28 U.S.C. 1255(1).

QUESTIONS PRESENTED

1. Whether the Court of Claims correctly held, on the particular facts of this case, that the United States has an implied license to use inventions for which petitioner Offner holds patents.

2. Whether petitioners had an adequate opportunity to answer the license defense asserted by the United States, where petitioners stipulated to the introduction of the government's evidence at the close of trial, and did not request that the record be reopened to present additional evidence on petitioners' part.

STATEMENT

Petitioners brought this patent suit under 28 U.S.C. 1498 seeking "reasonable and entire compensation" for alleged unauthorized use by the United States of inventions described and claimed in two patents owned by petitioner Franklin F. Offner ("Offner"). Petitioner Technical Development Corporation is Offner's exclusive licensee under the patents. The patents relate to electronic fuel control systems particularly suitable for use with jet aircraft engines (Pet. App. 5).

In early 1945, petitioner Offner submitted proposals to the government for the development of an electronic control system for jet-propelled aircraft. After some preliminary tests in 1945, Offner offered to develop and build a jet engine fuel control system for the government. On June 20, 1946, the United States entered into a contract with Offner's company, Offner Electronics, Inc. (also referred to as "Offner"), under which Offner would develop and build such a system. The contract called for Offner to provide a final report setting forth all details of his design development and testing, and included a "Patent Rights" clause by which Offner agreed to grant to the United States a license to any inventions "conceived or first actually reduced to practice * * * in the performance of the contract" (Pet. App. 8-9.)

In December 1946, Offner completed the fuel control device and sent it to the Allison Division of the General Motors Corporation ("Allison") for testing on a jet engine Allison was developing for the government. The device was again tested at Wright Field in May 1947 and was delivered to the government, so that the contract was deemed completed. In August 1947, Offner filed a patent application for the fuel control system. The patent issued and was ultimately reissued (No. Re. 24,809, "the '809 patent") as the patent involved in this suit (Pet. App. 9-10).

Sometime after mid-1946, and while Offner was developing the fuel control system described above, Offner and Thompson Products, Inc., decided to collaborate in efforts to pursue further development of the Offner control. On March 5, 1947, Offner Electronics and Thompson Products entered into a contract granting Thompson Products an exclusive license under Offner's fuel control inventions and any patents which might be granted thereto; Thompson Products agreed to manufacture fuel control systems using components developed and built by Offner. The control units were thereafter referred to as the "Thompson-Offner fuel system" (Pet. App. 10.)

On March 21, 1947, at a meeting attended by Offner and representatives of Allison, Thompson Products and the government, it was agreed by all that Allison would test fuel controls for its jet engines, including the Thompson-Offner fuel system. A contract between Allison and the government for this program was executed in March 1948, which contained a Patent Rights clause similar to the one in the earlier Offner-government contract (Pet. App. 10-11). In May 1948, pursuant to the terms and conditions of the principal contract, Allison entered into a subcontract with Thompson Products which also included a Patent Rights clause. Although Offner was not a signatory to this contract, he worked with Thompson Products in executing the subcontract and received 45 per cent of the proceeds payable under the subcontract (Pet. App. 11-12).

In late 1947 or early 1948, Offner conceived the idea for an acceleration circuit for the fuel control system. This circuit is the subject of Patent No. 2,697,908 ("the '908 patent"), also at issue in this suit. Sometime before September 1948, the Thompson-Offner fuel system (then being tested at a United States Air Force Base pursuant to the terms of the contract between Allison and the government) was modified by Offner to include the acceleration control circuit, and shortly thereafter the circuit was successfully flight-tested. Petitioner Offner was present throughout the flight testing and in fact was the principal representative of Thompson Products-Offner Electronics, Inc., for part of the time that the testing was taking place (Pet. App. 12).

In 1964, petitioners brought suit in the Court of Claims alleging that both the '809 and '908 patents were infringed by fuel control jet engine systems manufactured for the United States by the General Electric Company. The United States raised the defenses of patent invalidity and noninfringement and denied the allegation that it had made "unauthorized" use of the devices, but did not specifically and affirmatively plead that it had a license under its contracts. However, the possibility of raising such a defense was discussed between the parties and the trial commissioner (Pet. App. 2, 5-6). As a result of these discussions, the parties entered into a stipulation filed on August 28, 1968, which stated in part:

> 1. The parties agree that the initial trial to begin on or about September 3, 1968, will be restricted to claims 3, 4 and 5 of Reissue Patent No. 24,809 all of which relate to the electronic fuel control system for the J47 engine, and to claims 11 and 35 of Patent No. 2,697,908 which relate to the electronic control system for the afterburner section of the J85 engine.
>
> * * * * *
>
> 6. As indicated generally in the Pretrial Statement filed by Defendant on August 5, 1968,

> and as referred to in particular in Plaintiff's letter to Defendant on October 25, 1965, Plaintiffs were involved in contractual matters with the United States Government relating to electronic control equipment of the general type involved in the patents in suit, specific reference being made to contract No. W33-038 ac 15202 between the War Department (Army Air Forces) and Offner Electronics, Inc., dated June 20, 1946. Since a complete investigation of the matter of license defense by Defendant will require more time than is available before commencement of the trial session on or about September 3, 1968, the parties accordingly agree that the proofs will not be closed until such time as the Defendant has had an opportunity to investigate the license defense with respect to the aforesaid contract and such other contracts with which the Plaintiffs may have been involved, and at which time the parties agree to submit a report to the Commissioner, such report to indicate whether further trial days will be required to present the license defense.
>
> 7. The parties agree that the license issue will be diligently pursued but that full attention to the matter cannot be given until the present trial session has been completed.

Six months after the trial, but before the record was closed, the government submitted a package of documents to serve as the basis of its license defense. The documents were admitted into evidence by a stipulation between the parties as to their authenticity. The government's brief and recommended findings of fact itemized the grounds for its license defense

(Pet. App. 2, 3). Petitioners' response stated (Pet. App. 3):

> It is submitted that, in view of the full opportunity granted Defendant to call any and all witnesses desired, and at any place it might have specified, and its failure to do so, the evidence should be construed to prove nothing beyond that strictly contained within the documents, and that extended inferences be proscribed.
>
> If, however, there should be any doubt as to the validity of Plaintiffs' position, based on such a strict construction of the evidence, Plaintiffs would in no way object to the reopening of the proofs, so that each side could introduce such additional testimony and documents as might bear on an incontrovertible proof of the facts of the case.

The trial commissioner held that the United States was licensed under both patents and, accordingly, the issues of validity and infringement were not reached (Pet. App. 6). The commissioner held both that the United States was entitled to an implied license and that Offner Electronics and Thompson Products were joint adventurers in performing the Allison-Thompson subcontract; as joint adventurers, Offner and Offner Electronics were bound by the Patent Rights clause and other obligations of the subcontract to the same extent as was Thompson Products (Pet. App. 68-71). Only after the commissioner's decision was filed did petitioners allege a defect in the pleadings because of the government's failure to plead license as an affirmative defense. Petitioners sought unsuccessfully to reopen the case to consider further evidence on the license issue (Pet. App. 1-2).

The Court of Claims affirmed the commissioner's decision, noting particularly that the holding of implied license made it "very clear that defendant would still win even if the court were to grant plaintiff's motion to reopen" (Pet. App. 4). Alternatively, the Court of Claims accepted the joint venture basis relied upon by the commissioner (Pet. App. 4-5).

ARGUMENT

1. The Court of Claims' holding that the United States had a license to use the Offner inventions is based upon factual determinations and presents no issue warranting review by this Court. The June 1946 contract between Offner Electronics and the government granted the government a license to any inventions "conceived or first actually reduced to practice * * * in the performance of the contract" (Pet. App. 9). The Court of Claims found, after reviewing all the evidence, that the inventions at issue in the '809 patent were first actually reduced to practice in January 1947 in tests conducted at Allison; although prior tests had been run, the court found that the January 1947 tests were the first to demonstrate the operability, stability and reliability of the invention for practical use (Pet. App. 66-68). This factual determination does not merit review by this Court.

2. Concerning the '908 patent, the Court of Claims made two relevant determinations: (a) that Thomp-

son Products, as subcontractor to Allison, was bound by the Patent Rights clause of Allison's principal contract with the United States; and (b) that Offner and Offner Electronics, Inc., by virtue of their relationship with Thompson Products, also were bound by that clause. The court concluded, therefore, that the United States had a license to use the acceleration circuit which is the subject of the '908 patent.

It is clear that Thompson Products became bound by the Patent Rights clause because Thompson's subcontract stated that it was entered into in accordance with the principal contract and specifically noted the Patent Rights clause of that contract (Pet. App. 59). The Patent Rights clause was thus incorporated by reference into the subcontract. Cf. *J. S. & H. Constr. Co.* v. *Richmond County Hosp. Auth'y*, 473 F.2d 212, 216 (C.A. 5).

The implied license to the government under the '908 patent is based on the nature of the relationship between Offner and Thompson Products. The facts upon which the implied license is predicated are set forth in finding 64 of the Court of Claims (Pet. App. 70). Petitioners do not dispute these findings and they do not merit review by this Court. Similarly, petitioners do not challenge the finding that Offner was a joint adventurer with Thompson Products under the subcontract, and that as such Offner was bound by the terms of that contract, including the Patent Rights clause. Cf. *Lentz* v. *United States*, 346 F.2d 570, 575 (Ct. Cl.); *Bushman Constr. Co.* v. *Air Force Academy Housing, Inc.*, 327 F.2d 481, 484 (C.A. 10).

Rather than meeting these issues, which are the only issues necessary to a determination of the case, petitioners urge that this case is in conflict with *United States* v. *Dubilier Condenser Corp.*, 289 U.S. 178, and creates uncertainty in the area of patent claims. However, neither *Dubilier* nor any of the other cases cited by petitioners raises any conflict with the instant suit.

In *Dubilier*, the Court held that inventions by government employees who were not hired to make inventions do not automatically become the exclusive property of the government. This holding has no bearing on the instant suit, which involves a nonexclusive license between the government and a government contractor who was expected to make inventions.[1]

---

[1] Moreover, none of the Court of Claims cases cited by petitioners has any bearing on or conflicts with the instant suit. *AMP, Inc.* v. *United States*, 389 F. 2d 448 (Ct. Cl.), is totally inapposite, as it held that a government contractor was estopped from claiming that the government's exercise of rights under an admitted license pursuant to a patent rights clause infringed a pre-existing dominant patent later acquired by the contractor. *Tripp* v. *United States*, 406 F. 2d 1066 (Ct. Cl.), turned on state law concerning employees' rights and did not involve a contractual patent rights clause. *Eastern Rotorcraft Corp.* v. *United States*, 384 F. 2d 429 (Ct. Cl.), turned on the factual question whether an invention by a patentee had first been reduced to practice prior to or during the term of the government contract. Similarly, *Technitrol, Inc.* v. *United States*, 440 F. 2d 1362 (Ct. Cl.), involved the factual question whether the invention was conceived in or after performance of a government contract; the decision did not turn on the theory of "implied license" or joint venture, and therefore does not conflict with the instant case.

3. There is no merit to petitioners' claim that they have been deprived of property without just compensation by the government's failure to plead affirmatively its license defense. Unlike the situation in any of the cases cited by petitioners, here the license defense had been brought to the attention of petitioners before trial. Moreover, petitioners stipulated that evidence on the license defense issue could be presented after the close of trial, did not object to its admission into evidence, and did not unequivocally request that the record be re-opened to present additional evidence on their part. Petitioners were therefore in no way prejudiced, as they had a full opportunity both to meet the license issue and to request a further hearing if they felt it was necessary.[2] They cannot be allowed to wait until a decision has been rendered before first asserting the need for an additional hearing.

---

[2] Rule 39(b) of the Rules of the Court of Claims (Pet. 5-6) provides that when an issue not raised by the pleadings is tried with the express or implied consent of the parties, it shall be treated in all respects as if it had been raised by the pleadings, and the failure to amend the pleadings to conform them to the evidence does not affect the result of the trial of such issue. Rule 39(b) further provides, *inter alia*, that the court may receive evidence objected to on the ground that it is not within the issues made by the pleadings if the objecting party fails to satisfy the court that he will be prejudiced by its admission; a party who does so object is entitled to an opportunity to meet such evidence. See also Rule 15(b), Fed.R.Civ.P. Here, of course, petitioner failed to make any such objection or showing of prejudice.

CONCLUSION

For the reasons stated, the petition for a writ of certiorari should be denied.

Respectfully submitted.

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APRIL 1974.

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MICHAEL RODAK, JR.,

IN THE

Supreme Court of the United States

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No. 73-1145

TECHNICAL DEVELOPMENT CORPORATION and
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v.

UNITED STATES

REPLY BRIEF FOR PETITIONERS

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REPLY BRIEF FOR PETITIONERS

It is desired to correct a misstatement which appears in the Brief for the United States. It is asserted in the Respondent's Brief (page 9) that Petitioners do not dispute the facts set forth in Finding 64 of the Court of Claims or the finding that Offner was a joint venturer with Thompson Products. Petitioners do dispute these statements.

The Petitioners have repeatedly attempted to prove these statements to be erroneous. Such an issue was not raised until briefs were filed after the close of proofs. Petitioners sought to have the trial reopened so that crucial evidence on these issues could be introduced. This was refused by the Court of Claims, which refusal is one of the issues presented in the Petition here.

The failure of the Commissioner to follow the rules of the Court of Claims as to the formulation of issues to be tried has resulted in a serious injustice to Petitioners by depriving them of the opportunity to present evidence including testimony on the deciding factors of the case.

Respectfully submitted,

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TECHNICAL DEVELOPMENT CORPORATION and
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UNITED STATES

On Petition for a Writ of Certiorari to the United States Court of Claims

PETITION FOR REHEARING OF ORDER DENYING CERTIORARI

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UNITED STATES

On Petition for a Writ of Certiorari to the United States Court of Claims

PETITION FOR REHEARING OF ORDER DENYING CERTIORARI

Petitioners respectfully pray that the Court reconsider and vacate its order denying their Petition for Writ of Certiorari to review the judgment of the United States Court of Claims in the above entitled cause, entered by this Court on May 13, 1974, and grant the Petition for Writ of Certiorari.

As grounds for this petition, Petitioners respectfully request the Court's consideration of the following:

1. On May 28, 1974, this Court granted a Petition for Writ of Certiorari to the United States Court of Claims in *Williams & Wilkins Company* v. *United States,* No. 73-1279 (filed October 20, 1973);

2. Substantially the same question is presented in the petition of The Williams & Wilkins Company and the petition filed in this case. The common question is:

> Has the Court of Claims correctly applied the legislative mandate of 28 U.S.C. § 1498 when it excuses infringement by the Government of patents or copyrights on the ground of "fair use" or "public policy"?

3. Since this Court has granted certiorari in the *Williams & Wilkins* case and since essentially the same issue is involved, except as applied to patents, it is respectfully submitted that certiorari should be granted in this case also, so that both cases may be heard and determined together.

ARGUMENT

The Court of Claims has exclusive jurisdiction over claims for infringement of copyrights and patents by the United States, 28 U.S.C. § 1498(a),(b). This is, in effect, an eminent domain statute, *Crozier* v. *Krupp,* 224 U.S. 290, 305 (1911); *Richmond Screw Anchor Co.* v. *United States,* 275 U.S. 231 (1928); *Irving Air Chute Co.* v. *United States,* 117 Ct. Cl. 799,87 U.S.P.Q. 246 (1950).

The Petitioner in *Williams & Wilkins Company* v. *United States, supra,* is seeking reasonable compensation for the "taking" of Petitioner's copyrights.[1] A major argument presented in that Petition is:

> "Congress provided for copyright compensation as a companion subsection to the long-established provision covering government liability for patent infringement. The operation of the two remedies is similar . . . .
>
> As recognized by Congress, the government *in both patent and copyright situations* must have the right to use the protected work, subject only to the requirement that it pay the proprietor a reasonable compensation. Petitioner submits that the complete disregard of this approach by the majority of the Court of Claims . . . frustrates the legislative purpose." [Petition, p. 17 emphasis added]

In the present case, the Petitioners have made the identical argument respecting the "taking" of the Petioners' patents. They have asserted (Question No. 2, Petition, p. 2) that the denial by the Court of Claims of reasonable compensation for the "taking" of their patents because of "public policy" or "implied license" constitutes a "taking" without just compensation—just as the Petitioner in *Williams & Wilkins* is arguing with respect to the "taking" of its copyrght. The close identity of the basic issue in this case and in the *Williams & Wilkins* case amply justifies a reconsideration of the denial of certiorari here. In fact, it would be entirely appropriate for this Court to hear and consider the instant case at the time it hears and considers the *Williams & Wilkins* case, thereby permitting a fuller exploration of the "public policy" and "implied license" implications of § 1498. Much of what can be argued and considered in this case would be most relevant to the dialogue that will occur before his Court in *Williams & Wilkins,* and it would be most helpful to the lower courts and to the bar to have a definitive ruling as to the § 1498 problem as it affects both of those important commercial twins, patents and copyrights.

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[1] Petition, p. 12.

The instant case represents a further application of the expanded policy of 28 U.S.C. § 1498, as first expressed by the Court of Claims in *Mine Safety Appliances Co.* v. *United States,* 176 Ct. Cl. 177, 789; 364 F.2d 385, 392 (1966),[2] wherein the Court denied a claim by a patentee and licensee for unauthorized "taking" by the United States of patent rights in the invention of a crash helmet. The Court there stated wtih regard to legislative policy of 28 U.S.C. § 1498:

> "Even in the absence of a patent-license clause in the contract, the same general policy has been applied by this Court to give the United States an implied license, as against the contractor-patentee, to use inventions resulting from a federal experimental and development contract."[3]

The patentee did not seek review of the Court of Claims decision in *Mine Safety,* and this Court has not previously had an opportunity to review the expanded license policy first announced in *Mine Safety* and subsequently applied in several decisions of the Court of Claims (Petition, pp. 13-16). Precisely the same expanded policy was, in effect, borrowed from *Mine Safety* and applied to bar recovery in *Williams & Wilkins* for governmental use of copyrights. Thus, the Court now has the unique opportunity to consider that broadened policy as extended to: (1) one of a continuing series of patent cases arising under § 1498 (a); and (2) the first copyright case under § 1498(b).[4]

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[2] Pet. App. pp. 6, 15, 16, 71.

[3] Judge Collins concured only in the result. He did not accept the "questionable license theory" of the majority opinion, *id.* at 791, 364 F.2d at 393.

The facts involved in *Williams & Wilkins* are obviously different from the facts in the present case, but both cases turn on the Court of Claims' expanded license policy derived from 28 U.S.C. § 1498. Petitioner, Offner, at his own expense, developed, built and tested an electronic engine speed control system for aircraft jet engines. Subsequently, Dr. Offner made a gratuitous demonstration of his system to Air Force personnel, and the Air Force purchased one of the control systems. A patent was granted to Dr. Offner on his electronic engine speed control system. He made further developments upon which a second patent was ultimately granted. The Air Force awarded a contract to Allison Division of General Motors Corporation to test various fuel control systems, including Dr. Offner's improved system. Allison purchased one of Offner's systems from Thompson Products Company, a licensee of Offner, and successfully tested it on a jet engine supplied by Allison.

Later, government agencies purchased the patented electronic fuel systems from unlicensed manufacturers, and Petitioners brought suit in the Court of Claims to recover reasonable compensation under 28 U.S.C. § 1498 for the use of the patented inventions. Although neither Petitioner was a party to the contract between Allison and Thompson, the Court concluded that the improvement patent was licensed to the government either under an implied license theory or under a joint venture theory. The Court of Claims did not conclude that the government was licensed under the terms of a contract clause. Instead, the Court applied the policy announced in *Mine Safety* to give the government greater latitude in avoiding liability than private defendants have (Pet. App. pp. 15, 16). If the law of patent licensing that presently controls the rights of private parties were applied to the facts in the present case, the government's license defense would fail and Petitioners would be entitled to reasonable compensation under § 1498.[5]

---

[4] There is no substantive difference between the policy of § 1498(a) and § 1498(b), see *Williams & Wilkins*, Pet. p. 17.

The eminent domain statute for patent and copyright use by the government subjects the patents and copyrights involved to compulsory licensing in favor of the government. The denial of compensation for use of a copyright under the doctrine of "fair use" is essentially the same as the denial of compensation for the use of a patent on the ground of implied license or joint venture. As applied to copyrights and patents, respectively, these may be appropriate defenses available to the government, *DeForest Radio Telephone & Telegraph Co.* v. *United States*, 273 U.S. 236; 47 S.Ct. 366 (1927), but the injustice to Petitioners in both cases is in the use of these license defenses as a basis for applying a public policy as seen by the Court of Claims to give the government greater immunity from damages than would result if the suit were between private parties. Congress, when enacting 28 U.S.C. § 1498, did not express an intention to broaden the immunity of the government, but on the contrary enacted the policy of awarding reasonable and entire compensation for use by the government of patents and copyrights.

---

[5] The procedural problem presented in Question 3 of the Petition in the present case involving the closing of proof without giving Petitioners an opportunity to offer evidence relating to the license defense is not dispositive of the license defense issue.

The decisions of the Court of Claims in *Williams & Wilkins* and in this case erroneously construed congressional intent in 28 U.S.C. § 1498 to deny compensation for proven use of the Petitioners' copyrights and patents.[6] As stated by Chief Judge Cowen in dissenting from the majority opinion in *Williams & Wilkins Co.* v. *United States,* 487 F.2d at 1367:

> ". . . If Congress had intended to relieve Government agencies from liability for copyright infringement whenever the material is copied or otherwise reproduced without charge to the recipient, there would have been no need for the enactment of the 1960 Amendment, now 28 U.S.C. § 1498 (b), which gives us jurisdiction of this action."

CONCLUSION

For the reasons set forth in this Petition for Rehearing, as well as in the Petition for Wirt of Certiorari previously filed, it is respectfully urged that this Petition for Rehearing be 'granted and that upon further consideration, a Writ of Certiorari issue to the United States Court of Claims, so that this case may be heard and considered in tandem with the *Williams & Wilkins* case.

---

[6] The decision of the Court of Appeals in *General Tire & Rubber Co.* v. *Firestone Tire & Rubber Co.*, 489 F.2d 1105 (6th Cir. 1973) which was before this Court on Petition for a Writ of Certiorari No. 73-1529 when Petitioner applied for an extension of time, upon further study is not as relevant to the issues herein as the *Williams & Wilkins* case. Certiorari was denied in the *General Tire* case on June 3, 1974, but a petition for rehearing of that denial is now pending before this Court.

Respectfully submitted,

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Certificate of Counsel

I hereby certify that this Petition for Rehearing is presented in good faith and not for delay, and that this Petition is restricted to the grounds specified in Rule 58(2).

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